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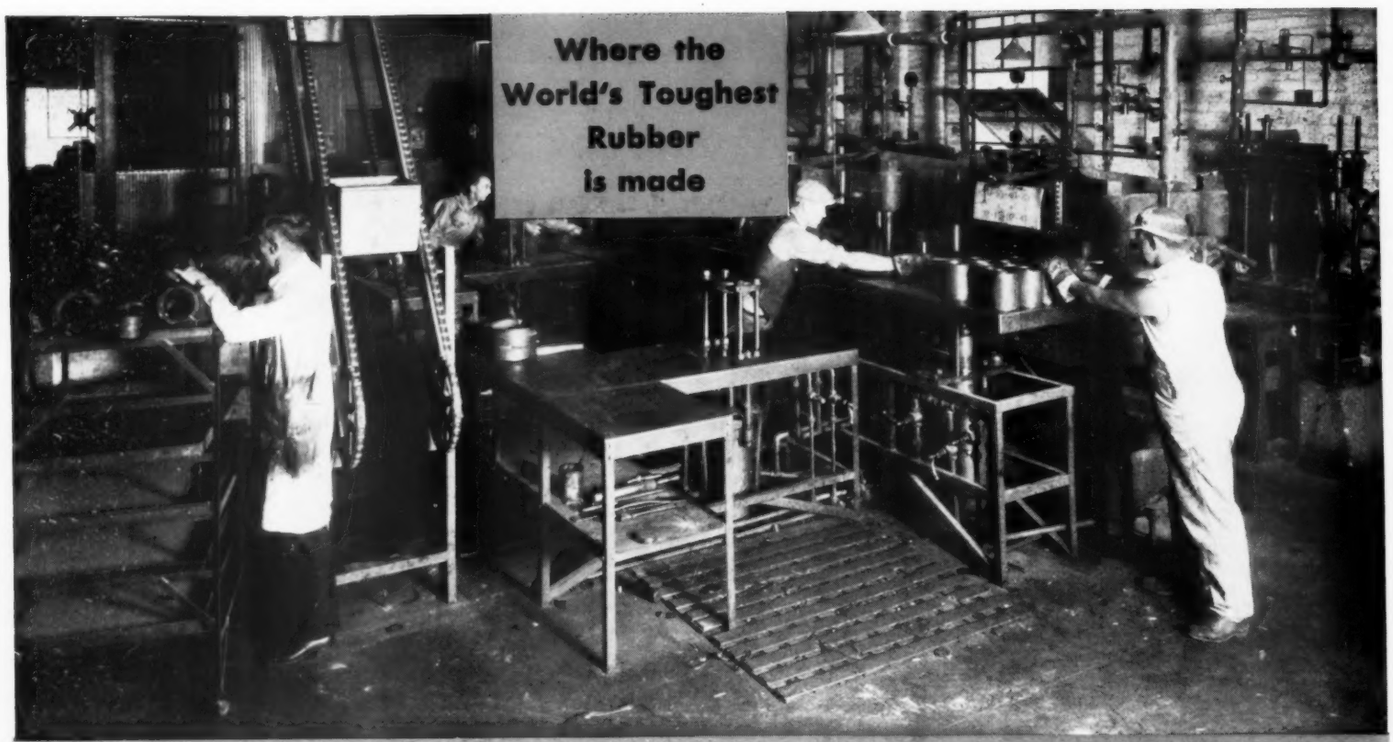

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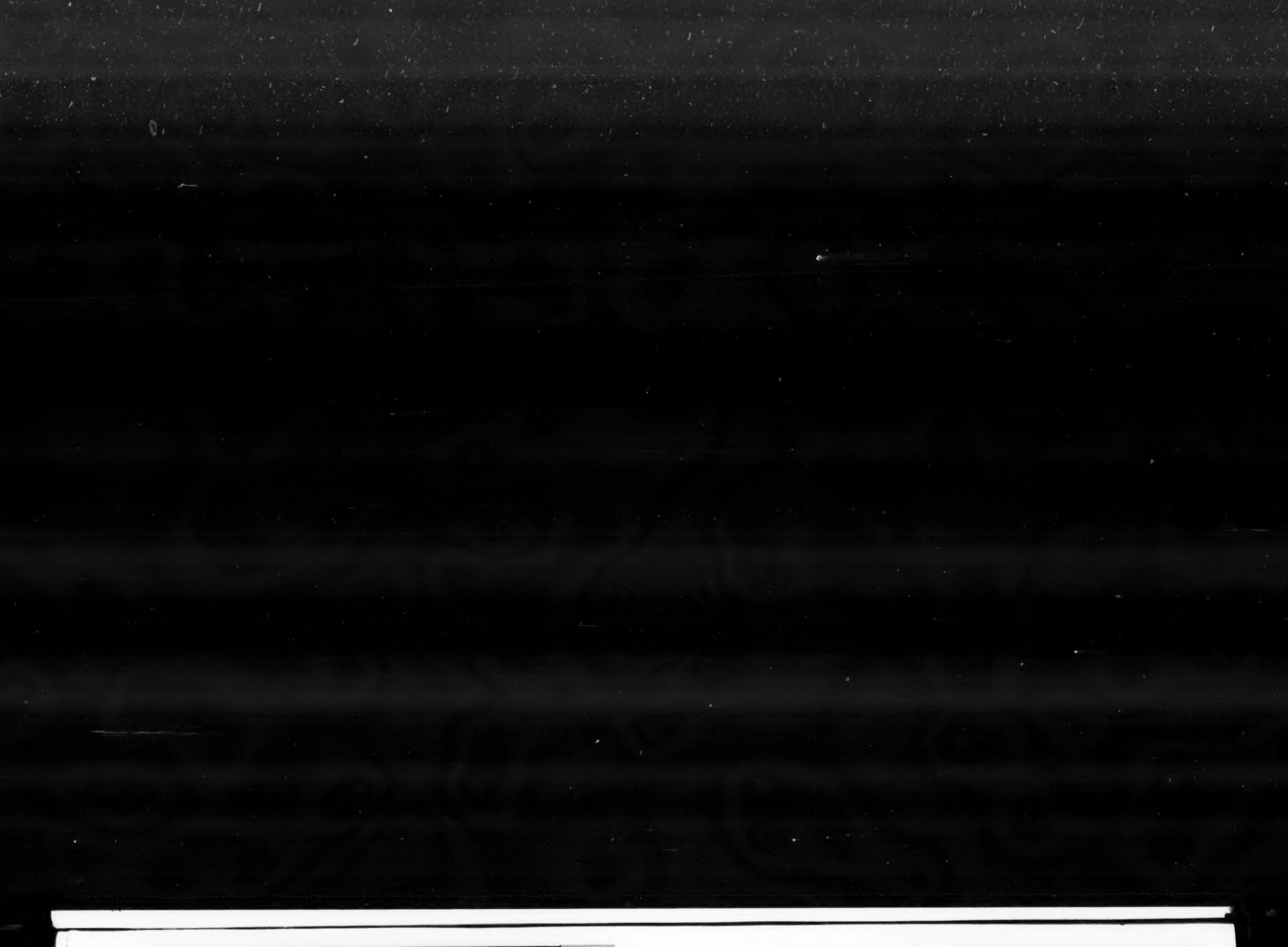

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BRANCH OFFICE CORRESPONDENTS

D. H. Bancroft, 538 Ricou Brewster Building, Shreveport, La.
L. E. Bredberg, 610 Petroleum Building, Fort Worth, Texas.
Paul A. Elliott, Chronicle Office, Muskegon, Mich.
Tolbert R. Ingram, 130 State Office Building, Denver, Colo.
Charles E. Kern, 602 Albee Building, Washington, D. C.
Victor Lauriston, Box 136, Chatham, Ontario, Canada.
B. E. V. Luty, Bessemer Building, Pittsburgh, Pa.
A. E. Mockler, Rooms 1919-21, No. 154 Nassau Street, New York, N. Y.
B. D. Stevenson, 1504 Milam Building, San Antonio, Texas.
L. P. Stockman, 522 Union Oil Building, Los Angeles, Calif.
John B. Waldo, Room 1416, No. 6 North Michigan Blvd., Chicago, Ill.
Leon H. Walter, Oil City Derrick, Oil City, Pa.
George A. Whitney, Box 98, Main Postoffice, Toledo, Ohio.
Neil Williams, 1316 Second National Bank Building, Houston, Texas.

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One Field Is Responsible for Increase

Highest production in 1930, week ending Feb. 22, average daily output 2,699,096 bbls. Peak of U. S. production, week ending Aug. 24, 1929, average 2,975,435 bbls.

Brief Opening of Oklahoma City Causes Upswing of Production Curve. Lower Prices Mean Heavy Losses

By James McIntyre

Lowest daily average crude oil production in the United States during 1930 was for week ending Dec. 27 with average output of 2,144,074 bbls.

The opening of wells in the Oklahoma City Field to permit producers to make up some of the allowable output to which they were entitled was the principal cause, one might almost say the sole cause, of a large increase in the average daily production in the United States in the past week. Oklahoma City's production average increased 62,630 bbls. per day over the week before, while the total increase in the country was 52,519 bbls. per day, indicating an appreciable decrease in some fields.

The almost general reduction in the prices paid for crude oil was the outstanding feature of the week. Altogether about 1,940,000 bbls. of crude, based on the average daily production for the past week, was cut in price to such a degree that it would be safe to say without carefully analyzing the various changes, that the income of producers was cut between $650,000 and $750,000 per day in the fields affected by lower prices. These figures on lessening of income are subject to change. When the settling of the market becomes general it will be found that the oil producer has suffered a loss even greater than the top figure above given.

The cut in price in California was about 50 cents per barrel on an average, while the high grade fields in Kansas, Oklahoma, Texas, Louisiana and Arkansas suffered an average 38-cent reduction. The new price schedule bears down very hard on the owners of scores of thousands of old wells averaging less than 1 bbl. per day in production. These owners include not only the small individual producer whose wells are his sole source of livelihood, but all of the big companies operating in the old stripper fields from the Pennsylvania Grade fields westward..

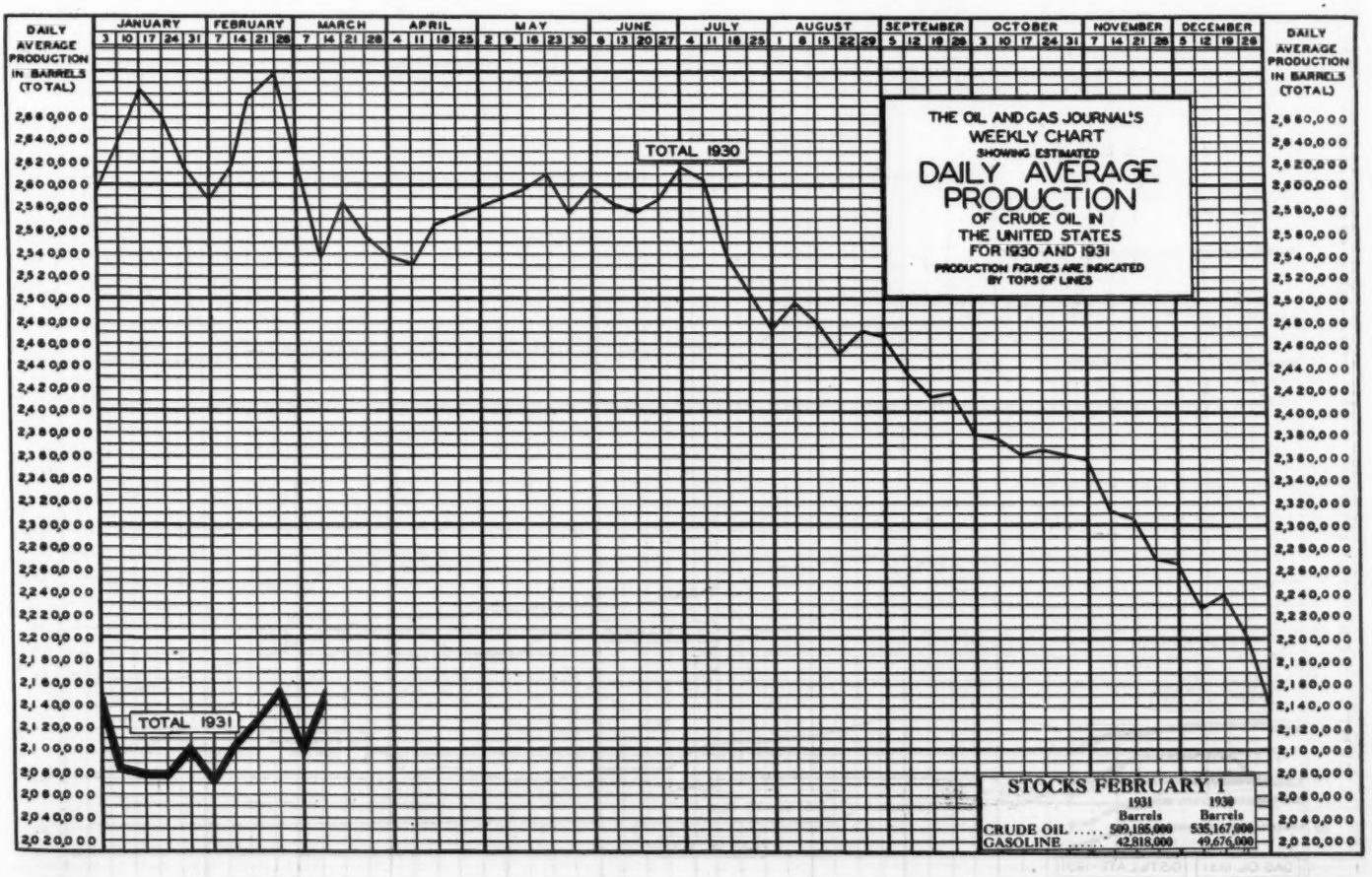
That there is no harm without some attending good is seen in the fact that refiners had discounted the price of crude and buyers of refined products, now that the new crude price has been established, are expected to come into the market for their spring requirements, and refined oil prices are expected to be stabilized at something near their present levels.

PRODUCTION IN THE UNITED STATES

Estimated daily average production of crude oil in the United States for week ended March 7 and a comparison with the previous week follows:

	Mar. 7	Feb. 28
Oklahoma—		
Oklahoma City	128,220	65,590
Seminole-St. Louis	131,240	146,760
Remainder of State	241,450	232,600
Total Oklahoma	500,910	444,950
West Texas—		
Hendricks	50,510	50,194
Yates	94,343	95,631
Remainder	97,528	99,528
Total West Texas	242,381	245,353
North Louisiana	41,250	42,815
Arkansas	47,935	50,055
North Central Texas	84,176	84,267
Texas Panhandle	53,424	53,175
East Central Texas	89,343	75,966
Kansas	112,115	112,720
Total Mid-Continent area	1,171,534	1,109,301
Gulf Coast	174,137	178,114
Southwest Texas	81,113	83,333
Eastern	111,500	109,250
Rocky Mountain area	91,346	98,613
California—		
Santa Fe Springs	71,500	72,000
Long Beach	91,500	92,250
Playa Del Rey	29,500	31,000
Elwood	33,000	30,750
Ventura Avenue	45,000	44,000
Kettleman Hills	26,000	25,500
Remainder of State	229,500	229,000
Total California	526,000	524,500
Total United States	2,155,630	2,103,111

→ Increase 52,519 Bbls. Daily ←



Refinery Market Had Discounted Cut

Lower Crude Prices Do Not Greatly Alter Oklahoma Quotations. Expect Early Stabilization

By W. T. Ziegenhain

Although gasoline is being quoted in the Oklahoma (Group 3) market below the level of prices a week ago as a result of the crude reduction first posted March 5, the new price is only fractionally lower and the balance of the list of refinery products shows no appreciable change. It is the general feeling among refiners and marketers that prices are now about as low as they will go and buying in greater quantities will soon develop. The refined oil market had apparently fully discounted the crude reduction.

Natural gasoline weakened during the latter days of the week in sympathy with the refinery gasoline market. Manufacturers expect no material change in prices for the next two weeks and are accepting orders for delivery over that period on today's prices.

Crude Cut Anticipated

The feeling that prices will not go materially lower and that the crude cut had been fully discounted is based on the fact that refinery margins do not indicate a profit from operations even after taking credit for the lower crude cost.

A skimming plant, operating on Seminole crude of 39 gravity and making 39 per cent gasoline, which is high, received $1.02 for all products made from each barrel processed. This is derived from a realization based on today's market. In this case the gasoline price was taken as 4 cents, the price quoted by most of the larger refiners. Taking into account the new posted price for 39 gravity crude at 65 cents, a drop of 39 cents from the $1.04 before the cut is shown. Assuming a normal pipe line charge of 15 cents per barrel and a bare manufacturing cost of 11 cents per barrel, the total operating expense totals 91 cents, leaving a margin of 11 cents per barrel at the refinery. This is not sufficient to pay the usual overhead, interest, taxes and depreciation. Furthermore, if 3½ cents is taken as the market price on the gasoline instead of 4 cents, the margin is practically eliminated.

In a similar manner the margin of profit to the refinery balanced for cracking all of the low-priced heavy products of the skimming plant is shown as 29 cents when using a base price of 4 cents for the gasoline. Here a yield of 72 per cent gasoline is assumed and for each one-half cent reduction in the gasoline price the margin is reduced 15 cents. The 29-cent margin is also said to be inadequate to pay the normal overhead, depreciation, interest charges and taxes on the required investment.

The only other type of plant to investigate is the complete refinery running to bright stock and lubs. The same condition is apparent here as exists in the other cases. Bright stock quotations and the market prices on motor oils and neutrals have been so reduced during the past six months the margin of profit from their manufacture is not attractive in most cases. An example comparable with the first two cases may be taken in the refinery making a maximum yield of bright stock and neutral oils and completely balanced for cracking. In this case it is assumed the gasoline yield will approximate 60 per cent. Based on the present market prices for all products, and using a price of 4 cents for the gasoline, the total revenue per barrel of crude run is shown as $1.76. From this is deducted the 65 cents as the cost of the crude, 15 cents as the pipe line charge, and 82 cents as the bare manufacturing expense. This leaves a margin of 14 cents and this, as in the other cases, is not sufficient to cover the overhead and indirect charges.

Although the market trend will likely be affected by the results of the many factors yet to be decided, such as the effectiveness of proration laws, the extension of the East Texas fields, and price wars in the retail market, the uncertainty of what has been considered a pending crude cut has been erased and the reduction has been so drastic as to wipe out any thought of a further reduction. With this fear removed, and because we are now entering into the season of increasing consumption, buyers are expected to regain confidence and begin purchasing with greater regularity.

Gasoline

While the larger refiners quoted 4 cents on U. S. Motor gasoline there was a considerable volume of material moving from the smaller plants at 3¾ cents and some at 3½ cents. Quotations were received by brokers on this grade of gasoline as low as 3¼ cents, but there was less of this being offered during the latter part of the week than during the early part.

(Continued on Page 151)

REFINED MARKET BAROMETER

The posting of lower crude prices throughout the greater portion of the United States led refinery quotations to lower levels but the greater share of the reduction had been discounted and early stabilization of prices is expected in most areas. The Eastern market has been most seriously affected through the belief that cheap California gasoline will find its way into the East Coast territory as a result of the 50-cent reduction in the California crude prices. Gasoline prices were generally lower than a week ago while the balance of the refinery products showed only scattered recessions.

Mid-Continent.—Except for refinery and natural gasoline price reductions the market quotations of the larger refiners on other products remained unchanged.

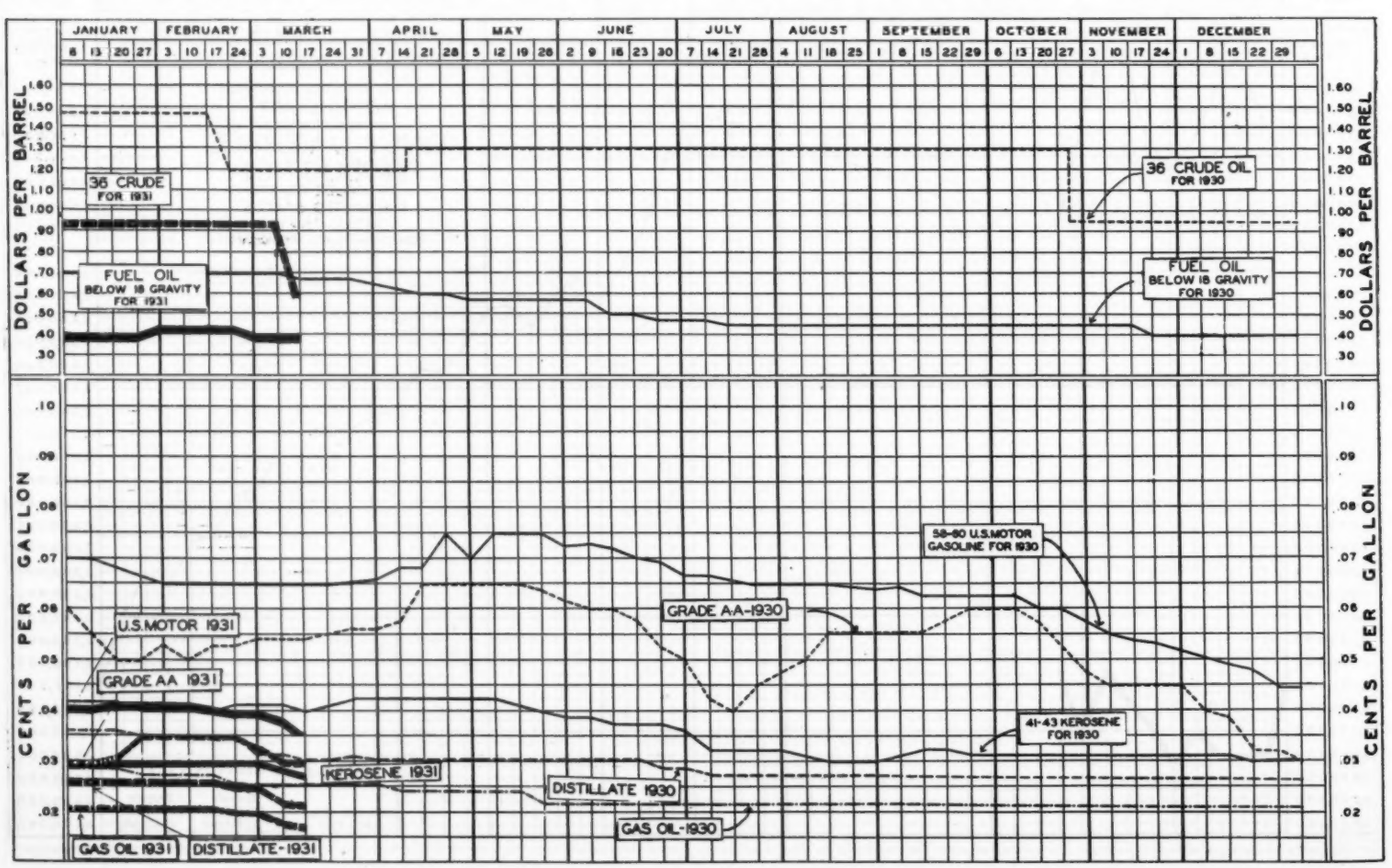
Eastern Seaboard.—Much of the progress over the past two months in regard to stabilizing the market appears to have been lost as a result of the crude price reductions in California and the Mid-Continent. Gasoline is the principal product under pressure but the outlook was made more optimistic Tuesday when most refiners stabilized prices on the U. S. Motor grade at 7 cents.

Gulf Coast.—The demand for all oils was slow and price shading has been resorted to in some cases, but the general level of last week's prices holds in face of lower markets in competing areas.

Chicago.—A lesser reduction in the price of gasoline and other products resulted from the Mid-Continent crude cut than was first anticipated and an early stabilization of the market and increased buying is expected over the immediate future.

California.—Lower prices were posted on gasoline, natural gasoline and fuel oil immediately following the reduction in the crude price. The balance of the refined oil market remains dull.

Pennsylvania.—There were no important price changes. The crude price reductions in other areas, however, dampened efforts to advance prices as planned earlier.



Few Fields Escape Deep Cuts in Crude

Market Prices Began Tumbling on March 5 and Kept It Up Daily in One or Another Producing Division

By James McIntyre

Crude oil prices tumbled in the past week, commencing on March 5 in the high grade fields in Kansas, Oklahoma and Texas, followed by a slashing of prices in the old Central West area, the Rocky Mountains, West Texas, Texas Panhandle, Southwest Texas, North Louisiana and Arkansas. Up to late Tuesday afternoon no changes had been made in Gulf Coastal prices excepting in Markham, Tex., while Pennsylvania grade oil was not affected up to that time, the only change made by the Joseph Seep Purchasing Agency having been a reduction in Corning, Ohio, crude.

Both the Union Oil Co. and the Standard of California cut Pacific Coastal crudes, but their price schedules are not alike in the same fields or on the same grades of oil.

The Stanolind Crude Oil Purchasing Co., the largest buyer of crude oil in the northern part of the Mid-Continent Field, posted a new and reduced set of prices effective at 7 a.m. on March 5. Assuming that 37 gravity crude is the weighted average of the production of Kansas, Oklahoma, East Central, North Texas and Central Texas, the Stanolind's cut averaged 37 cents per barrel in Oklahoma and Kansas and East Central and Central Texas and 12 cents per barrel in North Texas, sometimes known as the Wichita Falls district.

Following are the old and the new prices of the Stanolind company:

Gravity—	Old price Okla.-Kan., Cent. and E. Tex.	Old price North Texas	New price Okla.-Kan., E., N. and Cent. Tex.
Below 29	$0.65	$0.55	$0.43
29 to 29.9	.69	.57	.45
30 to 30.9	.73	.59	.47
31 to 31.9	.77	.61	.49
32 to 32.9	.81	.63	.51
33 to 33.9	.85	.65	.53
34 to 34.9	.89	.67	.55
35 to 35.9	.92	.69	.57
36 to 36.9	.95	.71	.59
37 to 37.9	.98	.73	.61
38 to 38.9	1.01	.75	.63
39 to 39.9	1.04	.77	.65
40 and above	1.07	.79	.67

All Companies Met Price

The cut in prices was immediately met by the Mid-Continent Petroleum Corp., White Eagle Oil & Refining Co., Standard Oil Co. of Kansas, the H. F. Wilcox Oil & Gas Co., the Eason Oil Co., the Producers Oil Co., the Tidal Oil Co., Tidal Western Oil Co., Sinclair Refining Co., Continental Oil Co. and the Champlin Refining Co. The Magnolia Petroleum Co. adopted the Stanolind prices for crude above 28.9 degrees in gravity but posted the following prices on the lower grades: Below 26 degrees, 40 cents; 26-26.9 degrees, 41 cents; 27-27.9 degrees, 42 cents; 28-28.9 degrees, 43 cents. On Monday, March 10, the Carter Oil Co. met the Stanolind prices in Kansas and Oklahoma and the Humble Oil & Refining Co. met them in the North Central, Central and East Central Texas Fields (Mexia district). The Texas Company met the schedule on March 10 in all the fields covered by the Stanolind schedule where The Texas Company is a buyer. The Gypsy Oil Co. and Gulf Pipe Line Co. were the last to fall in line, on March 10.

The announcement of the Stanolind Crude Oil Purchasing Co. was made on Wednesday at 5 p.m. Rumors had been flying around all week that the company would have an important price change to announce before the week ended, but rumors in the oil country are flying around every day in the year, most of them never materializing, and little heed was paid to this one.

The action of the Oklahoma Corporation Commission in partly yielding to the wishes of the Sinclair Oil & Gas Co., which petitioned the commission to issue an order making the allowable production of the Oklahoma City Field 175,000 bbls. per day, which petition resulted in a verbal order making the allowable 150,000 bbls. a day, came as a surprise to the average Oklahoma oil man, who felt that the lid would remain on in Oklahoma City because it had not even been able to get rid on a ratable basis of the 125,0000 bbls. a day it was already permitted to produce. The Stanolind company's announcement of a lower price schedule immediately started things in Oklahoma City. Governor Murray asked the Corporation Commission to rescind its order and put the Oklahoma City Field back on a 125,000-bbl. basis, which was done, and he also wired President E. G. Seubert of the Standard Oil Co. of Indiana asking him to recall the new prices. Governor Murray's message was as follows:

Governor Murray's Plea

"You are advised that at my request on this date Corporation Commission of this State entered its order revoking the order made on yesterday increasing the allowable oil and other matters in entirety and hold the same in abeyance until a later date. It appears that the action of your company in establishing a new posted price on oil of this State was by reason of the action of said commissioners in making said order. Such action by your company will have a disastrous effect on the whole industry of this State and your efforts to stabilize the matters in the oil-producing states. The matters will be discussed at the conference of the oil states committee at Texarkana, Arkansas, Monday, March 9. I urgently request that your company immediately place in effect an order revoking your order of March 4 and that the price of oil remain as of prior to that date. Will use my best efforts and offices to prevent if possible your competitors from securing oil at reduced price."

Seubert's Reply to Murray

Mr. Seubert's reply to Governor Murray's message was as follows:

"Your telegram of March 5 received. The economic situation forced us to cut price of crude oil as our action was taken after weeks of deliberation before we knew of your commission's order increasing the allowable output of your State. The impelling reason was that in the face of overproduction there is excessive drilling and constantly increasing willingness on the part of producers to accept lower prices. Our competitors have taken advantage of this situation and are now buying more than 100,000 bbls. of crude daily, much of which is from your State, at prices below those we have been paying. These companies or their connections are using this cheaper crude to compete with us in selling finished products.

"Crude oil buying must be on an equal basis. There cannot be one scale of prices for one group of companies and another for their competitors. It is obvious we cannot pay more for crude than our competitors and meet their prices in wholesale and retail markets and equally obvious we cannot expect our patrons to pay more for our products than they pay our competitors.

"Domestic production is responsible for the entire situation. We are in sympathy with your effort to improve the situation and sincerely desire to co-operate in every reasonable way. We will gladly pay more for crude the moment other purchasers are willing to do so but nothing short of fair and united action by all producers in the big producing states will overcome the present situation. Our obligation to the consuming public requires us to follow these economic conditions in spite of our sympathy We will welcome earliest assurance of improved conditions and hope the meeting of March 9 may mark the turn."

While all this was going on in Oklahoma, Texans were busying themselves to save the situation. Governor Ross B. Sterling, himself a veteran oil producer and one of the founders of the Humble Oil Co., jumped into the ring with a protest to President Hoover, who responded at once with instructions to Ray Lyman Wilbur, Secretary of the Interior and chairman of the Federal Oil Conservation Board, who at once besought oil companies that imported crude and refined products into the United States to voluntarily curtail their imports in the face of the serious condition of the business at home. All of the prominent importers with the exception of the Standard Oil Co. of Indiana were said to have at once expressed a willingness to do this and at the close of the week Secretary Wilbur was waiting to hear from the Indiana company.

Other Price Reductions

Reverting to matter of price cutting, the Stanolind's announcement was closely followed by that of the Ohio Oil Co., with price reductions in the old Central West fields of Ohio, Indiana, Kentucky and Illinois, and in the fields in Wyoming where that company purchases oil. The Ohio Oil Co. reduced the market price of Illinois and Princeton crudes 50 cents per barrel; Lima 20 cents; Indiana 37 cents; Wooster 36 cents, and western Kentucky 30 cents. Posting was discontinued in Plymouth while the field is shut in. In Wyoming the Ohio Oil Co. cut the price in Elk Basin, Grass Creek, Big Muddy, Lance Creek and Rock Creek 30 cents per barrel each. It made no change in the price in Kevin-Sunburst, Montana, and ceased posting in Artesia, N. Mex., where the oil it has been buying is shut in. The Central West changes were made effective on March 6 and the Rocky Mountain changes were effective March 5. The Producers & Refiners Corp. reduced the price in the Lost Soldier, Wyoming, Field 25 cents.

On March 6 the Union Oil Co. of California announced a sweeping downward change in prices in the California fields in which it purchases crude oil, to become effective on March 10. The Union is a large buyer. In his regular weekly correspondence elsewhere in this edition our California correspondent, L. P. Stockman, comments on the price change and reasons for it, while the new prices will be found in that part of the Journal devoted to crude and refined market prices.

The Standard Oil Co.'s new crude oil price schedule which became effective March 10 reveals a radical difference of opinion as to the refining qualities of oil in a number of California fields. The Union's schedule is fairly uniform but the Standard's new schedule of prices indicates either a number of discrepancies or a very marked superiority of certain grades of crude. At Signal Hill for instance 20 gravity oil is worth 2 cents per barrel more than 19 gravity oil, while 21 gravity oil is worth 3 cents per barrel more than 20 gravity oil. Twenty-two gravity oil, however, is only worth 1 cent more than 21 gravity oil. A similar difference exists in a number of fields particularly in gravities ranging from 25 to 28. Taken as a whole the Standard and Union schedules are fairly comparable with respect to the prices posted for the average gravity of each field although the former's prices, gravity for gravity, are slightly higher. This is the first time in a long while two or more different prices have been quoted for the same gravity oil by major companies in California especially at a time when major buyers are not making any new contracts for the purchase of crude oil under any conditions.

CALIFORNIA'S GASOLINE PRICE WAR CAUSES CUT IN CRUDE MARKET

By L. P. Stockman

LOS ANGELES, Calif., Mar. 10.—The Union Oil Co. of California, due to the serious gasoline price war existing on the Pacific Coast and because of the unsound theory of maintaining an uneconomic crude oil schedule out of line with the price received for refined products, took the initiative on March 6 and announced a substantial reduction in the prices which it will pay for crude oil at the wells on and after March 10.

This reduction, ranging from 5 cents per barrel on heavier grades of crude to a maximum of 92 cents per barrel for the highest grade of refining crude, and averaging approximately 50 cents per barrel, was subsequently met by other major companies.

The reduction in crude oil prices was not unexpected by those in close touch with the situation in California, as the prices paid for oil at the well were in no way commensurate with the price received for refined products. Periodic gasoline price wars have aggravated the situation and resulted in substantial losses from a financial standpoint. The seriousness of conditions on the Pacific Coast and the basic causes for the drastic reduction in crude oil price schedules is clearly indicated by the existing gasoline price war, one of several which have broken out in the past. This competitive struggle for gallonage began on February 25 when the Standard Oil Co. reduced its allowance to resellers 2 cents per gallon and followed this up by another cut of 4 cents per gallon on February 28 and a further cut of 2 cents per gallon on March 6. This drastic reduction of 8 cents per gallon within a period of 10 days brought the retail price of gasoline in southern California territory down from 20½ cents to 12½ cents per gallon, tax paid.

It is quite obvious that substantial buyers of crude oil could not economically maintain previous unsound price schedules in the face of existing conditions. On the basis of 12½ cents per gallon the net back to refiners is practically negligible, in as much as this figure includes a 3-cent gasoline tax, a 4-cent differential to resellers and a 1 or 2-cent hauling charge, depending upon the distance from the district distributing facilities. It is quite evident that refiners are losing money on every gallon of gasoline sold at present prices as these figures do not include overhead and other operating expenses. The present price war was precipiated by the chronic unsettled condition prevailing in southern California due to the ability of independent refiners to pick up cheap crude oil substantially below prices heretofore quoted by major buyers. A considerable quantity of crude oil from Playa Del Rey and Long Beach has for the past several months been going over the board for as low as 10 to 25 cents a barrel. The

(Continued on Page 151)

Mid-Continent Crude Runs at New Low

Estimate for March 80,000 Bbls. Below Year Ago. More East Texas Plants Proposed but Actual Construction Slow

By Robert C. Conine

A decrease of 20,491 bbls. in the daily average refinery crude oil runs in the Mid-Continent area during March, as compared with figures for the preceding month, is seen in the estimate of crude charges to stills just completed. An average of 470,125 bbls. daily were charged to the stills during February, while anticipated runs to Mid-Continent refineries in March average 449,634 bbls. daily. This March figure is 81,866 bbls. below that of March, 1930, when 531,500 bbls.

RUNS TO STILLS AT MID-CONTINENT REFINERIES

1929	
January 1	508,550
February 1	506,800
March 1	514,950
April 1	530,530
May 1	577,500
June 1	585,030
July 1	565,800
August 1	555,250
September 1	552,300
October 1	544,720
November 1	545,473
December 1	540,630
1930	
January 1	535,460
February 1	519,355
March 1	531,500
April 1	555,250
May 1	574,300
June 1	572,250
July 1	548,475
August 1	526,400
September 1	498,710
October 1	518,800
November 1	506,700
December 1	478,360
1931	
January 1	478,795
February 1	470,125
March 1	449,634

of crude were processed at the plants daily.

In only one section, North Louisiana, is an increase indicated. During March, Louisiana's additional runs will total 4,175 bbls. The accompanying table shows the amount of decrease in the six districts of the Mid-Continent. While not so large, a decrease is also reported in cracking operations, with many of the cracking plants running at 25 and 50 per cent of capacity.

The accompanying tables, compiled from the estimates given by the individual companies, summarize the data on refinery runs, and make apparent an effort on the part of refiners to hold down their production to the level of demands.

MID-CONTINENT REFINERY OPERATIONS

(Based on Operations March 1, 1931, and February 1, 1931)

District—	Mar. 1 No. of plants	Mar. 1 Daily crude cap. (bbls.)	Mar. 1 Daily crack cap. (bbls.)	Mar. 1 Plants oper.	Mar. 1 Runs to stills	Feb. 1 Plants oper.	Feb. 1 Runs to stills	Daily decr.
Arkansas	10	47,800	21,250	8	21,000	8	23,100	2,100
Kansas	15	147,000	88,200	14	77,100	14	79,400	2,300
North Louisiana	6	54,300	13,000	4	28,075	4	23,900	*4,175
Oklahoma	53	334,300	119,150	39	173,040	52	179,500	6,460
North and Central Texas	44	194,950	63,600	39	101,049	37	108,725	7,676
West Texas	29	147,600	53,250	18	49,370	21	55,500	6,130
Total	157	925,950	363,450	122	449,634	136	470,125	20,491

*Increase.

Ten new refineries are planned for East Central Texas, and of these seven have moved to the actual construction stage. The remaining three are merely projected. Sylvester Dayson and others have leased 18 acres near Kilgore as a site for a small skimming plant which will process crude oil from the Bateman Field. A short pipe line is to be laid from the field, now extended within 2½ miles of Kilgore, to the refinery.

L. F. Boon of Breckenridge, Tex., has shipped two small stills to a location just east of Arp, Smith County, Texas, where he proposes to build a 1,000-bbl. capacity skimming plant. Joiner crude oil will be run to this refinery. However, there has been no announcement that a pipe line will be laid to Arp, although Allstate Refining Co. is understood to be contemplating such a line, as well as a skimming plant for Arp.

Southern Oil & Refining Co. has announced plans to build a 3,000-bbl. skimming plant at Friar Switch, on the I.& G.N. Railroad north of Joiner Field. A 4-inch line is to be laid from the field to this plant, a distance of 3½ miles.

J. P. Gillen, formerly vice president of Deepwater Oil Refineries, Inc., is planning to build a 2,500-bbl. skimming plant near Joiner Field, and Constantin Refining Co. has announced intentions to construct a 5,000-bbl. skimmig plant at Tyler, Tex., to process the Joiner Field crude oil.

Work on the two new refineries of Burford Oil Co. and East Texas Refining Co., which were consolidated recently, is under way and the plants, one at Henderson, Tex., and the other at Longview, are expected to be in operation in April. Both are 6,000-bbl. skimming plants. Taylor Refining Co. is building an 8,000-bbl. skimming plant at Tyler, Tex. Plans have been announced for the laying of a 24-mile 6-inch pipe line from the Joiner Field to this plant. The Taylor company operates a 6,000-bbl. skimming plant at Taylor, Tex. The Beacon Oil & Refining Co.'s new 2,000-bbl. skimming plant is nearing completion at Henderson, Tex.

Oklahoma

In Oklahoma the situation is somewhat uncertain because of the dozen or so small skimming plant operators who are either shut down now or running at a fraction of capacity because of market conditions.

Kansas

The shutdown plant recently purchased from Peerless Oil & Refining Co. by Altitude Petroleum Corp. at Chanute, Kans., is being repaired and is expected to be in operation this summer. This is a 3,000-bbl. skimming plant and is equipped with Jenkins type cracking units. While Kansas showed an increase in February over January in average daily runs to stills, 1,850 bbls., this State will run 2,300 bbls. less crude oil in March than in the preceding months.

In Texas, Simms Oil Co. will operate its skimming plant at Dallas during the first half of March only. At its Smackover, Ark., plant, Simms Oil Co. will run 12,000 bbls. of cracking stock to the cracking units, while the refining plant will remain inoperative. Union Asphalt Co., which has an asphalt plant at El Dorado, Ark., has ceased to run crude to this plant and takes residue from the Lion Oil Co.'s plant.

REFINERY OPERATIONS IN NORTH LOUISIANA

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs Mar. 1	Runs Feb. 1
Bayou State Refining Co., Hosston	750	500	500
Crystal Oil Refining Co., Shreveport	14,000	(*)	(*)
D'Artois Oil Refining Co.	25	25	25
Louisiana Oil Refining Co., Shreveport, Bossier	19,000	17,650	13,900
Shreveport-El Dorado Pipe Line Co., Shreveport	10,000	7,100	6,500
Stanolind Oil & Gas Co., Superior	3,500	2,800	3,000
The Texas Company, Shreveport	7,000	(*)	(*)
Total	54,300	28,075	23,925

*Shut down.

REFINERY OPERATIONS IN ARKANSAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs Mar. 1	Runs Feb. 1
James H. Berry & Sons, Waterloo	2,000	1,300	1,300
Henry H. Cross Co., Smackover	6,000	4,000	4,000
Houston Oil Co., Camden	6,000	(*)	(*)
Kettle Creek Refining Co., Pearson	5,000	1,550	1,700
Lion Oil & Refining Co., El Dorado	12,000	6,000	6,000
Macmillan Petroleum Products Co., Norphlet	1,800	1,600	1,550
Ouachita Valley Refining Co., El Dorado	2,000	1,000	1,000
Root Refining Co., El Dorado	10,000	5,650	5,650
Simms Oil Co., Smackover†	3,000	(*)	2,000
Total	47,800	21,000	23,100

*Shut down. †Simms Oil Co., Smackover, will run 12,000 bbls. of cracking stock to units during March.

REFINERY OPERATIONS IN OKLAHOMA

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs Mar. 1	Runs Feb. 1
Anderson-Prichard Oil Corp., Cyril	5,000	4,500	4,000
Barnsdall Refineries, Inc., Barnsdall	4,000	3,200	3,200
Barnsdall Refineries, Inc., Okmulgee	10,000	3,500	3,000
Bell Oil & Gas Co., Grandfield	4,500	1,600	1,600
Black Gold Refining Co., Oklahoma City	1,500	800	800
Capital City Refining Co., Oklahoma City	2,500	(*)	700
Century Petroleum Co., Tulsa	500	(*)	200
Century Petroleum Co., Oklahoma City	2,500	(*)	(*)
Champlin Refining Co., Enid	16,000	8,000	8,000
Citizens Refining Co., Seminole	1,000	(*)	(*)
Continental Oil Co., Sapulpa	10,000	1,500	1,500
Continental Oil Co., Ponca City	30,000	15,000	11,000
Crump Refineries, Inc., Oklahoma City	2,000	(*)	(*)
Cushing Refining & Gasoline Co., Blackwell	1,800	1,500	1,200
Cushing Refining & Gasoline Co., Cushing	3,500	2,500	3,000
Deep Rock Oil Corp. (Shaffer), Cushing	10,000	10,000	10,000
Eason Oil Co., Enid	5,000	3,000	3,000
Electrol Refining Co., Oklahoma City	3,000	(*)	(*)
Empire Oil & Refining Co., Cushing	5,000	(*)	(*)
Empire Oil & Refining Co., Okmulgee	4,000	4,000	4,000
Empire Oil & Refining Co., Ponca City	8,000	8,000	8,000
Garber Refineries, Inc., and Omar Refining Co., Garber	3,500	2,200	2,700
Globe Oil & Refining Co., Blackwell	7,500	5,500	5,000
Globe Oil & Refining Co., Cushing	16,000	5,000	6,000
Gulf States Corp., Oklahoma City	2,500	3,000	2,500
Illinois Oil Co., Cushing	3,000	(*)	(*)
Imperial Refining Co., Ardmore	5,000	(*)	(*)
Johnson Oil Refining Co., Cleveland	6,000	4,800	3,500
Mid-Continent Petroleum Corp., West Tulsa	40,000	18,500	20,000
Marathon Oil Co., Boynton	2,500	1,500	2,000
Marathon Oil Co., Bristow	5,000	3,500	3,400
Morgan Development Co., Tonkawa	3,000	(*)	(*)
Peacock & Peveto Refining Co., Oklahoma City	3,000	600	650
Peppers Gasoline Co., Covington	1,000	670	700
Phillips Petroleum Co., Okmulgee	5,000	3,300	3,600
Producers Oil Co., Bristow	2,500	1,500	1,500
Producers & Refiners Corp., West Tulsa	6,000	4,000	4,000
Pure Oil Co., Ardmore	5,000	2,000	2,000
Pure Oil Co., Muskogee	9,000	6,000	6,000
Rock Island Refining Co., Beckett	3,500	3,500	3,500
Sinclair Refining Co., Muskogee	1,000	(*)	(*)
Sinclair Refining Co. (Pierce), Sand Springs	8,000	5,500	6,800
Sun Oil Co., Yale	5,000	4,300	4,500
Sunray Oil Co., Allen	7,000	4,000	5,200
The Texas Company, West Tulsa	15,000	14,000	14,000
Texas Pacific Coal & Oil Co., Wynnewood	3,000	(*)	(*)
Tidal Oil Co., Drumright	15,000	9,000	9,000
Western Oil Corp., Beckett	2,000	1,400	1,450
Wewoka Refining Co., Wewoka	3,000	(*)	(*)
White Oak Corp., Allen	8,000	(*)	1,800
Wilcox Oil & Gas Co., Bristow	5,000	2,500	2,500
Wirt Franklin Petroleum Corp., Ardmore	4,000	3,170	3,000
Yale Oil Corp., Yale	2,000	500	1,000
Total	334,300	173,040	179,500

*Shut down.

REFINERY OPERATIONS IN KANSAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs Mar. 1	Runs Feb. 1
Barnsdall Refineries, Inc., Wichita	4,000	3,100	1,800
Derby Oil Co., Wichita	7,500	4,000	4,000
Eldorado Refining Co., Eldorado	4,500	2,500	2,300
Golden Rule Refining Co., Wichita	1,500	900	800
Kanotex Refining Co., Arkansas City	12,000	5,500	7,000
National Refining Co., Coffeyville	6,500	4,000	5,000
Peerless Oil Refining Co., Chanute	3,000	(*)	(*)
Phillips Petroleum Co., Kansas City	6,000	5,300	6,300
Shell Petroleum Corp., Arkansas City	22,000	10,000	10,000
Sinclair Refining Co., Coffeyville	12,000	9,000	8,600
Sinclair Refining Co., Argentine	9,500	4,500	4,600
Skelly Oil Co., Eldorado	23,000	11,800	11,200
Standard Oil Co. of Kansas, Neodesha	20,000	5,000	5,000
Vickers Petroleum Co., Potwin	3,500	2,500	2,300
White Eagle Oil Corp., Augusta	12,000	9,000	10,000
Total	147,000	77,100	79,400

*Shut down.

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President Crawford Warns Refiners

Must Simplify and Control Their Business, He Says. Plain Talk on "The Brokerage Game." P. M. Miskell on Export Outlook

By C. O. Willson

EXCELSIOR SPRINGS, Mo., Mar. 10.—Refiners should pay more attention to the problem of balancing the output of their plants against marketing requirements, not only from the standpoint of their own operations, but those of the entire industry, L. R. Crawford, president of the Western Petroleum Refiners Association, told the membership at the opening session of the annual meeting here this afternoon.

President Crawford pointed to the available current statistics as furnishing the yardstick by which the operations of all companies should be governed for the purpose of securing a well balanced operation for the entire industry.

"If the program of any refining industry includes a raid upon the business of other companies, they can expect a battle in which low gasoline prices will be the chief weapons," Mr. Crawford declared in his plea that the programs of the individual operators should include consideration of the position of competitive refiners, pointing to the present unsatisfactory market situation as the result of unwise and unbalanced expansion of refinery activities.

TRIBUTE IS PAID TO MR. PIELSTICKER

EXCELSIOR SPRINGS, Mo., Mar. 10.—Members of the refining industry in session at the annual meeting of the Western Petroleum Refiners Association expressed their sorrow in the passing of F. A. Pielsticker, for many years a familiar figure at all meetings of refiners and for two years the president of the association. Mr. Pielsticker died at Redlands, Calif., in January.

The resolution adopted by the association today said in part:

"Mr. Pielsticker in his relations with his family and his fellowman was widely known and loved for the honorable standards and fine qualities of his personal life and his loss is mourned by a host of friends throughout the oil world."

Mr. Crawford also stressed the necessity of an adequate and proper description of refined products as a guide to the marketing branch, pointing out that in the case of gasoline there was considerable difference in specifications among grades having the same general description.

He also condemned the practice of making long-time contracts which worked a hardship on the entire industry. He called upon the refining industry to cooperate in eliminating the evasion of state gasoline taxes and condemned the tendency of states to increase the tax rate.

Election of Officers

All officers were re-elected at the annual election held this afternoon. The officers, in addition to Mr. Crawford, are the following: Vice presidents, George D. Locke, vice president Barnsdall Refining Co., Chicago; E. D. Eddleman, general manager, American Refining Properties, Wichita Falls, Tex., and M. Grogan, president, Louisiana Oil Refining Corp., Shreveport, La. Over a hundred were present at the opening meeting, coming from all parts of the Mid-Continent and Middle West. Although the meeting was not marked with any special optimism, informal discussions around the lobbies of Elms Hotel indicated a belief that the worst is over so far as the refining branch of the industry is concerned. Some improvement in market conditions is expected with the arrival of spring weather and the opinion was frequently expressed that recent declines in tank wagon and service station quotations will tend to stabilize that branch of the industry.

The opening session of executives today will be followed by the two-day meeting of the manufacturers committee. Several papers on technical subjects are to be presented at these meetings.

Miskell on Outlook

P. M. Miskell, general manager of the refining and marketing departments of the Empire Oil & Refining Co., in a talk on market conditions, did not hold out much hope as to export outlets for the Mid-Continent refiners over the remainder of the year. He presented considerable statistical data showing the expansion of production and refining facilities, tending to show that foreign refiners are rapidly reaching the point where they can take care of the demand for all the principal products outside the United States.

He particularly stressed the strong position of Russia in the world's oil picture, stating that country alone in a short time can furnish all the gasoline and other products required in Europe and other countries provided it carries out the expansion program now under way. He said the crude oil production of Russia would total 108,000,000 bbls. this year and in 1933 this production will be doubled. From the standpoint of comparative costs he pointed out that the Russian oil industry had no internal competition, and had unit control and development, no duplication of operation, no royalties and no profits or dividends to pay. He presented data showing the modernization of their operating equipment.

Dr. E. R. Lederer, vice president of the Texas Pacific Coal & Oil Co. and chairman of the association's committee on lubricating oils, presented a progress report showing the work being done which will strengthen the position of lubricating oils made from Mid-Continent crudes.

H. C. Camp, general superintendent of refineries for the Empire Oil & Refining Co., told of the co-operative work which the association's committee is carrying on with the Government's committee relative to new tests and specifications for gasoline.

President Crawford's Address

President Crawford in his annual address spoke in part as follows:

"It would be wise for us to simplify our business and to some extent control this rumor and hearsay evidence by choosing and using a common vocabulary. We are very fortunate that we have to start with U. S. Motor gasoline which has been clearly defined for us by the United States Department of Commerce, but it seems not to be so clearly understood by the refining and jobbing industries. Rumors that 415 endpoint gasoline had been sold at a certain price caused salesmanagers to believe that U. S. Motor gasoline should be sold at a lower price, although 415 endpoint material was no more or less than U. S. Motor gasoline. Evidence, hearsay or otherwise, that 437 endpoint gasoline had been sold at a certain price caused salesmanagers to drop U. S. Motor gasoline to that figure although the 437 endpoint material was not full U. S. Motor gasoline, and in the knowledge of every manufacturing department, could be produced for a very considerably lower figure than U. S. Motor gasoline. Information that U. S. Motor gasoline has been sold at a certain price has caused a general reduction in gasoline prices though the material in question, although entirely up to U. S. Motor specifications, was of bad color and therefore not acceptable to the general trade. Rumors of a sale of high antiknock rating gasoline has caused lower demand, reduced prices for other gasoline which was actually of as good antiknock rating but for which no such claims had been made because the gasoline had been tested in another manner. We are all familiar with these things but have done nothing about it. I therefore suggest that after full discussion, in which the opinion of the membership can be expressed, that a committee should be appointed which, with the advice of our standing technical committee, should suggest to the association, for adoption and use, a common vocabulary describing our products.

"It has been largely our practice to sell our gasoline under contract extended over a year or more. Originally these contracts were made with a price clause including only either guaranteed margin or a spot price. Later, under pressure of overproduction, the refiner included the option of these two methods of pricing in the same contract. It has also become the practice to base the spot price on one or more trade publications. In the earlier days a contract might work out unfavorably for a refiner for part of the year but as a rule was very favorable in the remainder of the period. Under present practice, if the spot price happens to be high, the marginal guarantee takes effect and consequently there is no period of high prices for the refiners under our present practice. As a rule these contracts expire in the late fall or early spring and are, therefore, auctioned off at a time when the industry is under the influence of seasonal depression and heavy stocks. It has, therefore, worked to the effect that refiners are contracted to sell their products for the remainder of the year at prices unduly effected by the pressure of overproduction.

Should Study Statistics

"If this pressure can be removed by the study of statistics which are now available and by the proper regulation of refinery runs much of the benefit from such action would be nullified by contract already in existence, giving large marginal guarantees which are at present nonoperative because of the low spot price. It is, of course, neither desirable nor legal to agree at this or any other meeting as to the term of any contracts to be written but I believe it would be entirely within our province to discuss among ourselves the effect of certain contract clauses upon our individual welfare, so that we may write contracts representing our individual ideas of good business with a clear understanding of the effect of such contract on our own companies directly and indirectly through their effect on the whole industry. It is unfortunate that the industry has not adopted a contract form with close relation to costs. It should be recognized that those of us who write contracts are dependent on the prosperity of the other party to the contract, that is the jobber. It should also be recognized that the success of the jobber is dependent upon the success of the first party to the contract, the refiner.

Danger in Large Margins

"It is my belief that the reputable experienced jobber does not welcome too large margins. It is their experience that this merely leads to bootlegging with the inevitable loss of gallonage and consequent higher expense per gallon, followed by lower tank wagon prices. Large guaranteed margins which are, as a rule, the effect of spot prices so low that the marginal guarantee does not come into play at the moment, may spell ruin to a refiner at the whim of the companies upon whose tank wagon prices these margins may be based. It is, I think, well recognized that the fortunes of every branch of the industry depend on a reasonable profit over cost for each branch of the industry. It has not, however, been clearly recognized how very responsive the whole industry is to an ill advised act by some unit, however small, and how quickly the whole industry reacts upon the individual who started the movement. It seems, therefore, advisable that in writing contracts, over any extended period, no company should allow itself to be influenced by the pressure of momentary depression, that its actions will extend this depression over the period of its contract, even though the condition of the industry has improved.

"The Brokerage Game"

"Through costly experience we have all learned not to guarantee a broker a fixed profit on sales for which he is permitted to fix the price. Yet we do the same thing in our spot market contract based on a publication which reports the spot sales of companies which feel the necessity of selling at a price lower than our contract prices. Perhaps the only profitable part of our old gambling game was that handled by the brokers. Their relation to the re-

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WILBUR APPOINTS NEW COMMITTEE TO SURVEY SUPPLY AND DEMAND

WASHINGTON, D. C., Mar. 10.—At the request of the American Petroleum Institute, Secretary of the Interior Ray Lyman Wilbur, as chairman of the Federal Oil Conservation Board, announced the appointment of a Vountary Committee on Petroleum Economics to survey the supply and demand factors in the petroleum industry for the six months' period beginning April 1 and ending September 30, 1931. The committee consists of E. B. Swanson, chief economist, United States Bureau of Mines, chairman; John W. Frey, Bureau of Foreign and Domestic Commerce; Martin Van Couvering, petroleum engineer, Los Angeles; Alfred G. White, National Industrial Conference Board, New York City, and Howard Bennette, Western Petroleum Refiners Association.

Two reports, similar in character to the one projected, were made in 1930 by a volunteer committee consisting of J. Elmer Thomas, Fort Worth, Tex, chairman; Joseph E. Pogue, New York City; Ray M. Collins, Tulsa; H. W. Lowrie, Jr., Denver, Colo., and H. B. Grimm, Los Angeles. These reports or surveys were made as the result of a unanimous request by the board of directors of the American Petroleum Institute, and the data thus compiled served more or less as a guide to the industry, resulting, oil executives asserted, in more orderly production and a pronounced diminution of hitherto generally recognized wasteful and extravagant methods which the industry in recent years has sought to correct. The problem of estimating the crude oil requirements of the country was approached by the former committee through an analysis of the prospective consumption of gasoline and a translation of the gasoline demand into the domestic crude oil needed to provide the necessary gasoline.

The Swanson committee will meet here in the first few days of April and will have its report in the hands of Secretary Wilbur by April 7 to reach the American Petroleum Institute April 15.

General Geology of Eastern Texas

The Eastern Rim of the Gulf Embayment in Texas-Louisiana Presented in Nontechnical Language for Lay Reader

By La Verne Decker

It is the purpose of this article to offer to the readers of this journal a brief, general picture of the geological factors involved in the present activity along the eastern border of the East Texas Basin or geosyncline or the western edge of the Sabine Uplift. Figure No. 1 shows the location of the area. This paper deals particularly with the region covered by the northeastern portion of the map.

Various comment will be found relating to areas contiguous to the one treated, but it is not the purpose of this paper to discuss in detail the geology of the East Texas district. The paper will be of little interest to geologists who have worked the area. It is intended to be a not too technical discussion of the subject and of chief interest to the general reader.

In expressing opinions such as those offered in this article, it is difficult to extend the proper credit to those to whom it is due. The writer has drawn on all available publications and upon orally expressed opinions of many men to whom he wishes to acknowledge his debt for the information obtained.

At the end of the paper there is a partial bibliography of the literature pertaining to the area. The reader is referred to the publications mentioned for a more comprehensive study of the geology of the area.

General Geology

In general the area is well dissected by major streams flowing in a southeasterly direction across the Coastal Plain to the Gulf of Mexico. The elevation above sea level is as much as 500 feet, with a maximum relief of 250 feet. The valleys of the major streams are usually broad and flat. In some cases the drainage is inadequate, but in general the terrain is a succession of hills and valleys with the topography in early maturity. There is some evidence that the topography and drainage pattern is affected by structure. The subject will be discussed in another part of the paper.

Table No. 1

SYSTEM	SERIES		GROUP	EAST TEXAS	LOUISIANA AND ARKANSAS
TERTIARY	EOCENE	Claiborne	Cook Mountain	Saline Bayou Milam Crockett Sparta	St. Maurice Jonesboro Minden Sparta
			Mt. Selman	Weches Queen City Reklaw Carrizo	Cane River undifferentiated
				Wilcox	Wilcox
				Midway	Midway
CRETACEOUS	GULF		Navarro		Arkadelphia clay
				Escatoch sand	Nacatoch sand
			Taylor		Saratoga chalk
				Pecan gap, chalk	Marlbrook marl
					Annona chalk
				Wolfe City sand	Ozan fm. with Buckrange sand and Oakes sand at base
			Austin		Brownstown
				Blossom sand	Tokio fm.
				Bonham clay	
				Woodbine sand	Woodbine sand
	COMANCHE		Washita Fred'berg	Undifferentiated Washita and Fredricksberg	Undifferentiated Washita and Fredricksberg
			Trinity	Glen Rose	Glen Rose
				Lower Trinity	Lower Trinity

Areal Geology.—For a general picture of the areal geology of the region the reader is referred to the maps published by Duessen, Dumble and Wendtlandt and Knebel. The Eocene beds listed in Table 1 and described in the body of the report are based upon the writer's observations and the last paper mentioned. The stratigraphic nomenclature is based on names used in that article.

Regional Structural Features.—The controlling factors in the general structural geology of the area are the Sabine Uplift and the East Texas Basin. Stated in another way, the eastern border of the basin is approximately the western edge of the uplift. Roughly, the western rim of the basin is the outcrop of the Woodbine. The geosyncline is a horn-shaped basin with its point in Miller County, Arkansas and the open end centered in northern Houston County, Texas.

The regional dip at any point on the east side of the basin is toward the center of the trough and directly basinward from the center of the Sabine Uplift.

Stratigraphy

The rocks exposed at the surface along the western flank of the Sabine Uplift are all of the Eocene series of the Tertiary system. The strata have been described in detail in various publications. It will suffice here to list the exposed formations with brief comment on their several characteristics.

The Wilcox sand is the lowest or oldest formation exposed along the rim of the basin. It varies in thickness from 700 to 2,000 feet. The maximum thickness is found in the center of the Gulf Embayment, west of the Sabine Uplift. The formation is sand and sandy clay throughout with characteristic lignite beds and sandstone concretions. The large sandstone concretions are noticeable along the highway from Marshall to Shreveport.

Claiborne Group

The Claiborne Group is composed of the Mount Selman at the base and the Cook Mountain at the top. In turn, the Mount Selman, from the base upward, is composed of the Carrizo sandstone, the Reklaw clays, sand and greensands, the Queen City sand and shale and the Weches greensand. The overlying Cook Mountain includes the Sparta sands, and the Crocket, Milam and Saline Bayou beds. Of the Cook Mountain beds, only the Sparta sand is exposed in the area under discussion.

The Carrizo is composed of from 1 to 50 feet of sand with some pinkish, bentonitic clay at the top in contact with the Reklaw. The minimum thickness of 1 foot is given above on the assumption that some Carrizo is always present between the Wilcox below and the Reklaw above. The writer is not at all certain that such is the case. There are points near Woodlawn in Harrison County where the Reklaw apparently rests on the Wilcox sand.

The Reklaw ranges in thickness from 40 to 140 feet. The maximum thickness observed by the writer is along the Marshall-Jefferson highway in the southern part of Marion County. The basal part of the formation is composed of mottled red and gray clays, red to yellow sands alternating with 1 to 3-foot beds of glauconitic, mealy sands which are sometimes fossiliferous. The upper part of the for-

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Figure 1.
GENERAL MAP OF EASTERN TEXAS, NORTHWESTERN LOUISIANA AND SOUTHWESTERN ARKANSAS

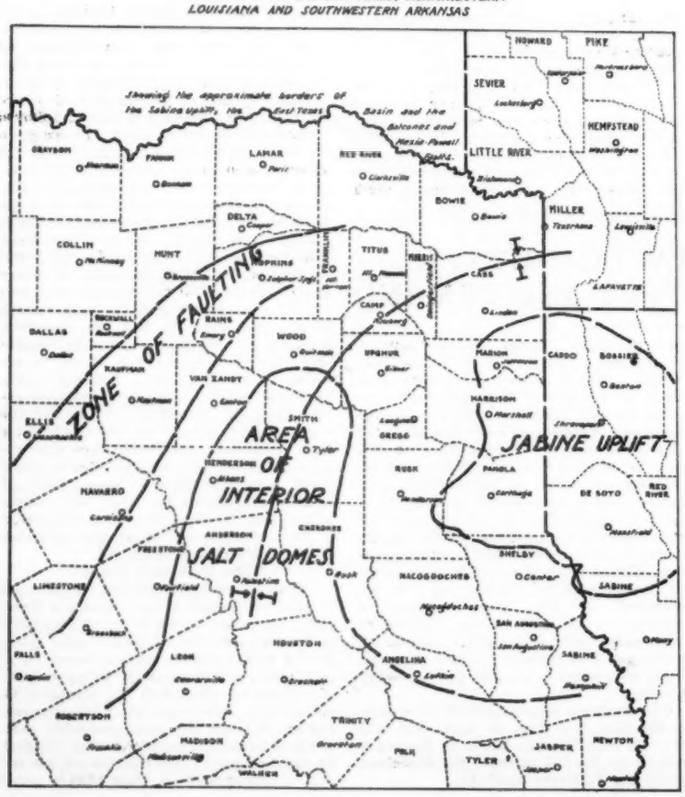
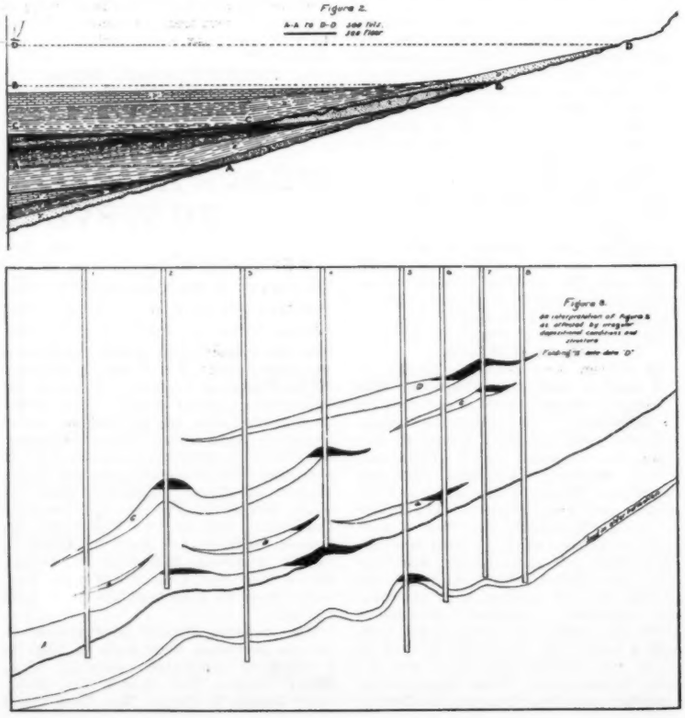


Figure 2.



Ten Thousand-Foot Well Is in Sight

Shell Oil Co. Drilled Below 9,700 Feet in a Test in California, the Deepest Hole in the World Thus Far

By L. P. Stockman

LOS ANGELES, Calif., Mar. 7.—Deep drilling has been an important factor in the production situation in California during the past several years and a check indicates that this deep work will become of still greater importance during the next 10 years, not only from a production standpoint but from wildcat exploration as well. A few short years ago prospective oil land was condemned and considered barren if a test drilled to a few thousand feet failed to secured commercial production. Increased knowledge as a result of subsequent deep drilling and a pronounced advancement in the science of geology has changed the picture considerably with the result that no well financed company suspends drilling until

Shallow producer in the Newhall Field in California, drilled in 1876 to a depth of 1,000 feet by the California Star Oil Co., predecessor of the Standard Oil Co. of California. This well was No. 4 on the lease.

the geological formation precludes any possibility of a substantial accumulation of oil and gas.

There is no question but that deep drilling is destined to play a very important part in California's future production of oil and gas as several prolific fields are already known to contain virgin zones which will require deep drilling to tap. In addition to these zones, which are being held back until conditions improve, deep drilling will be especially conspicuous at Kettleman Hills and in the Lost Hills-Belridge Fields, and probably in other areas also, especially where substantial production of high gravity oil may be anticipated. The north dome of Kettleman Hills is already proved up as highly productive with depth, as two wells, No. 1 Huffman of the Superior and No. 2 Felix of the Petroleum Securities, both registered substantial production upon completion. The former showed an initial daily production of 12,000 bbls. per day from 8,327 feet, while the latter was good for 5,250 bbls. daily from 8,100 feet. It is logical to assume that subsequent drilling will result in the completion of additional wells at still greater depths, provided that this is possible from a drilling and production standpoint.

Kettleman Hills Deep Zones

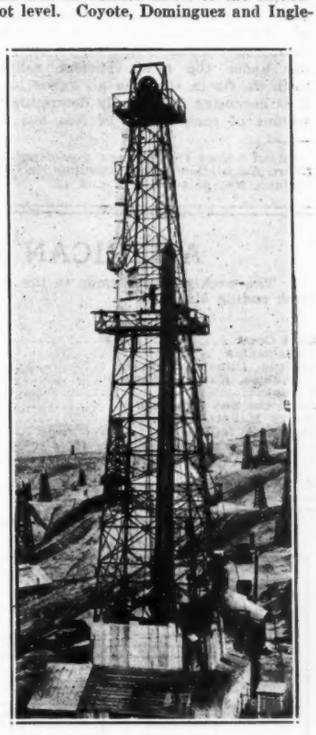
That deep drilling will become a factor of great importance in the North Dome at Kettleman Hills is evident from the performance of individual wells with respect to production of oil and gas. The greater productivity of the lower or Ochsner zone in the North Dome will undoubtedly stimulate deep drilling, notwithstanding that the crude oil from this horizon is somewhat inferior to that yielded by the upper, or Elliott zone. It might not be amiss to call attention to the fact in this connection that there is apparently no definite marker between the so-called Elliott and Ochsner zones. The writer has designated the upper portion of the productive horizon in the North Dome as the Elliott zone and the lower portion as the Ochsner zone. The Elliott zone was so named because the Milham's discovery, No. 1 Elliott, was the first well to prove the productiveness of this zone. The lower zone, or bottom of the producing horizon, has been designated as the Ochsner zone because the General Petroleum's No. 2 Ochsner was the first well to secure production in this horizon. Subsequent developments may change this classification as future drilling near the apex of the structure may reveal two separate and distinct zones. At the present time, however, with deep drilling limited to wells located around the edge of the structure there is no evidence of independence.

The outstanding characteristics of the Elliott zone include relatively large production of extremely high gravity oil testing approximately 60° A.P.I., accompanied by tremendous quantities of natural gas, which naturally results in an unusually high gas oil ratio. It is not at all uncommon for a well to produce 40,000 feet of natural gas for each barrel of crude brought to the surface. The oil from this zone contains approximately 90 per cent gasoline and is practically free of the heavier hydrocarbon fractions. Because of the large quantity of natural gas produced in conjunction with the oil, the amount of natural gasoline produced is almost as important as the production of oil. During January, 1931, the Elliott zone produced 350,811 bbls. of crude oil and approximately 300,000 bbls. of natural gasoline. On the basis of $1.65 per barrel for crude and 5 cents per gallon for natural gasoline, this zone netted operators approximately $1,200,000, exclusive of the value of natural gas.

Ochsner Will Be Favored

Because of its greater productivity, however, operators will undoubtedly center their activities on the Ochsner zone and pass up the Elliott horizon until a later date. This means that there will be a considerable amount of deep drilling in the North Dome of Kettleman Hills during the next several years. The Ochsner zone yields a normal black oil averaging approximately 45° A.P.I. Only two wells in addition to the General Petroleum's No. 2 Ochsner, which is shut in, have been finished in this horizon up to date, but both of them indicate the existence of substantial production on a low gas oil ratio basis. It is too early to venture more than a guess as to the ultimate recovery per acre at Kettleman Hills but several petroleum engineers anticipate an aggregate crude oil production of 75,000 bbls. per acre from the Elliott zone and 100,000 bbls. per acre from the Ochsner zone. It is estimated that about 20,000 acres will be productive in the North Dome. The Ochsner zone should extend under all of this but the Elliott zone should be limited to the apex of the structure, or that area extending along the axis. If this condition prevails, the North Dome should produce approximately 2,000,000,000 bbls. of crude oil and a vast quantity of natural gas and natural gasoline.

Although the average completion depth at Kettleman Hills during the next several years will probably be around 7,500 feet, it is not at all improbable that a number of holes around the edge of the field will be carried down to the 10,000-foot level. Coyote, Dominguez and Inglewood are known to have deeper productive zones and recent drilling in the town lot area at Huntington Beach indicates the probable existence of a deeper horizon in that field also. It is interesting to note in this connection that Huntington Beach will witness a revival of intensive town lot development within a short time after the existence of a new deep zone is actually determined. The status of this horizon is rather uncertain at the present time in as much as it has not yielded any oil, but those in close touch with the situation feel confident that commercial production will be secured. Certainly, the amount of new development which has got under way within the past few weeks is indicative of success, especially in view of the fact that two of the new wells were started by the Superior Oil Co. and interests closely allied with this concern.



The Standard Oil Co.'s No. 1 Mascot in the Midway-Sunset Field in California. This well, temporarily suspended with the hole at a depth of 9,620 feet, was the deepest in the world until very recently when the Shell Co. of California drilled its wildcat well, No. 1 Williams in the Semitropic area, Kern County, to 9,700 feet.

Drilling Below 9,700 Feet

The Shell Oil Co. recently broke the world's record for deep drilling when it carried No. 1 Williams, a wildcat in the

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END OF BARCO CONCESSION TROUBLE UNLIKELY TO SET DRILLS TO WORK

By A. E. Mockler

New York Bureau, The Oil and Gas Journal

NEW YORK, Mar. 9.—Termination of the litigation over the famous Barco concession in Colombia through the action of the Colombian minister of industries in signing a contract granting Colombian Petroleum Co., owned by Gulf and Carib Syndicate, the right to operate part of the original concession for the next 50 years, is not expected to result in any immediate development of Colombian production.

Reports from Bogota state the agreement gives Colombian Petroleum, owned 75 per cent by Gulf and 25 per cent by Carib, exploitation rights in 1,000,000 acres of the original 11,500,000 acres covered by the Barco concession, and add that Gulf and Carib have promised the Colombian government to build a $25,000,000 pipe line to link up the Barco concession field with tidewater.

While no official announcement has been made by Gulf relative to its plans, it is not believed the company will go forward with extensive development work in the near future. The lands covered by the Barco concession, according to Colombian reports, cover what is believed to be one of the world's greatest oil fields. The land included in the grant is not advantageously situated for economical development, other more promising fields lying nearer seaboard. In addition, Gulf, along with The Texas Company and Sinclair, was signatory to the protest recently presented to the Colombian government, in which specific complaints against features of the proposed new Colombian oil law were outlined.

The Colombian government thus far has not indicated any willingness to grant foreign oil companies the concessions and terms which these companies feel necessary to permit of orderly development of Colombian oil reserves, and it is not felt the current action on the Barco concession will materially change the situation, as onerous provisions of the petroleum law which Gulf previously had protested against have not yet been removed.

There are many features in Colombia, not the least of which is the necessity for relatively high expenditures for pipe line construction, which would militate against crude production development in that country under any but the most favorable terms from the government, it is stated. The uneconomic phases of Colombian operations are further accentuated by the present disturbed position of the world oil market and the extremely low crude prices.

The Barco concession during the last five years has been the subject of diplomatic correspondence between Washington and Bogota. The concession was granted originally in 1905 to Gen. Virgilio Barco of the Colombian army. General Barco disposed of the grant in 1918 to the Colombian Petroleum Co. In 1926 the Gulf Oil Co. paid $2,500,000 for a controlling interest, the Gulf interest being held by South American Gulf Oil Corp., a subsidiary. In the same year, following difficulties with the Colombian government and internal agitation against foreign exploitation of Colombia's oil resources, the concession was declared cancelled by the government. Gulf Oil Co. filed suit in the Colombian Supreme Court against this cancellation, and the litigation has continued until now. The action of the Colombian minister of industries in awarding Colombian Petroleum Co. approximately 1,000,000 acres of the original grant presumably settles this litigation.

Discuss Pressure Distillate Stabilization

Cause for Vapor Locking Often Traced to High Percentage of Pentane Left in the Refinery Gasolines

By A. W. Burket
Jackson Engineering Corp.*

FACTORS INFLUENCING CHOICE OF EQUIPMENT

Such a wide variation exists in the operating condition among refineries that a definite procedure must be followed in planning a stabilization plant for any one of them in order to best fit the needs of that refinery. The authors discuss here, first, the need for such a survey, second, they present a basic flow chart which may be modified to suit most any conditions, and third, they discuss the more important factors which control the design of stabilizing equipment.

The advent of fractional distillation analysis has made it possible to accurately determine quantitatively all the vapor losses in the refinery. As a result it is possible to determine quantitatively the undesirable hydrocarbons present in light distillates, which can be removed and replaced by desirable hydrocarbons and to predict the savings which can be effected by changes in handling methods in the fractionation of pressure distillates.

Vapor losses in any refinery can be divided into two general classes, preventable losses and nonpreventable losses. By preventable losses are meant those which can be reduced in quantity or prevented entirely by more efficient refining methods. By nonpreventable losses are meant those vapor losses which of necessity occur under the most efficient refining methods. So in studying all vapor losses it is necessary to not only determine the volume of each source of loss but also endeavor to determine the cause of each loss with the thought of preventing or reducing it. In many cases preventable losses can be traced to the lack of an adequate water cooling system. In general it is considered economic to cool the circulating water to within 5 or 10° F. of the wet bulb temperature, which wet bulb temperature in very few places in the United States, with the exception of the Gulf Coast region, exceeds 75° F. average during July and August. Yet it has come within the observation of the writer that 90° F. and 95° F. water is not uncommon in the summer time, and in a few instances 100° F. and 105° F. water. With these water temperatures the volume of vapors must necessarily be high, and consequently the treating of these vapors for the recovery of valuable hydrocarbons is not only inefficient but unduly high in cost. It means not only the circulation of more absorption oil because of greater vapor volume, but also the circulation of more oil because of high oil temperatures. Some refiners have endeavored to avoid stabilization of their light distillate streams by purposely operating with high condenser temperatures. This has effected a fairly stable product from the topping plant, because the crude contains very little propane; and second, because of the low operating pressure. But in the distillate produced by cracking, large quantities of propane are present, and the losses of valuable butanes and heavier due to high condenser temperatures are not commensurate with the slight reduction of propane that will be effected in the distillate. This is a physical law based on the fact that the vapor and liquid in any accumulator approach equilibrium with respect to each

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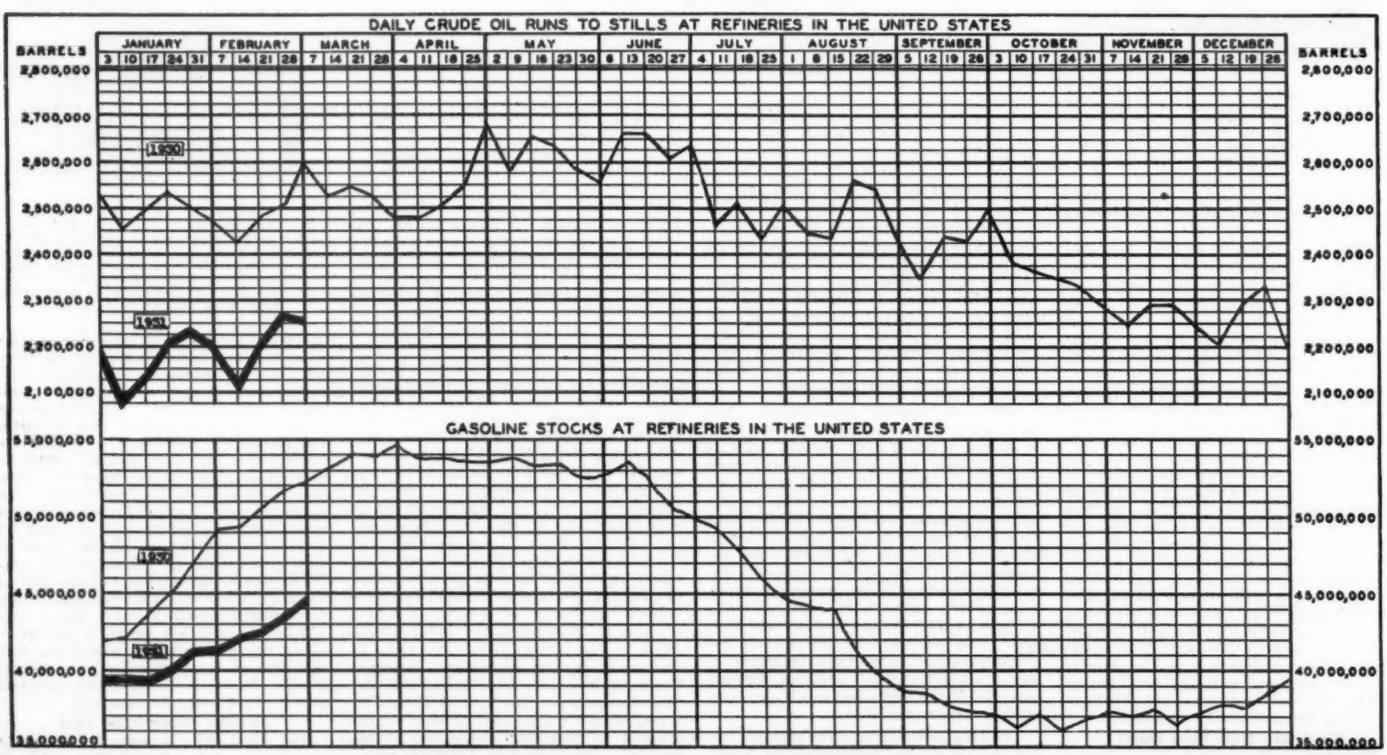
*Read before the Western Petroleum Refiners Association annual meeting Excelsior Springs, Mo., March 10, 11 and 12.

AMERICAN PETROLEUM INSTITUTE WEEKLY REFINERY STATISTICS

The weekly report made to the American Petroleum Institute on refinery statistics—crude runs to still, gasoline stocks and gas and fuel oil stocks in barrels—for the week ending March 7.

	Week ending March 7				Week ending February 28				Week ending March 12, 1930			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
East Coast	100.0	452,600	8,180,000	7,085,000	100.0	440,000	7,929,000	7,300,000	100.0	3,315,600	8,520,000	6,353,000
Appalachian	93.8	92,700	1,512,000	1,052,000	93.8	96,300	1,480,000	1,096,000	91.0	632,200	1,794,000	671,000
Indiana, Illinois, Kentucky	97.5	270,600	5,169,000	3,057,000	97.5	289,600	5,140,000	3,026,000	98.6	2,078,200	7,861,000	2,895,000
Oklahoma, Kansas, Missouri	89.4	221,000	3,336,000	3,777,000	89.4	247,700	3,245,000	3,757,000	98.1	1,935,700	4,707,000	3,338,000
Texas	91.9	544,800	7,920,000	8,319,000	91.9	546,400	7,290,000	9,421,000	90.8	4,114,100	8,377,000	11,727,000
Louisiana and Arkansas	98.3	139,700	1,907,000	2,363,000	98.3	144,000	1,801,000	2,337,000	92.6	1,166,700	2,608,000	2,103,000
Rocky Mountain	93.1	37,600	1,840,000	851,000	93.1	37,400	1,851,000	893,000	99.2	335,200	2,896,000	1,058,000
California	98.8	413,100	16,025,000	100,924,000	98.8	464,700	16,046,000	101,315,000	95.5	4,151,000	16,369,000	109,324,000
Total United States	95.7	2,172,100	45,789,000	127,428,000	95.7	2,266,100	44,792,000	129,145,000	95.5	17,728,700	53,132,000	137,469,000
Texas Gulf Coast	100.0	438,600	6,670,000	5,930,000	100.0	433,600	6,030,000	7,057,000	100.0	3,201,600	7,183,000	9,047,000
Louisiana Gulf Coast	100.0	94,400	1,684,000	1,308,000	100.0	93,700	1,591,000	1,266,000	100.0	748,000	2,287,000	1,276,000

(1) Per cent of refinery capacity represented. (2) Daily crude runs to stills. (3) Gasoline stocks. (4) Gas and fuel oil stocks.



*Data for 1930 based on weekly reports of the American Petroleum Institute. Data for 1929 derived from monthly reports of the Bureau of Mines, Department of Commerce. Figures for last week not shown in graph but are included in above tables.

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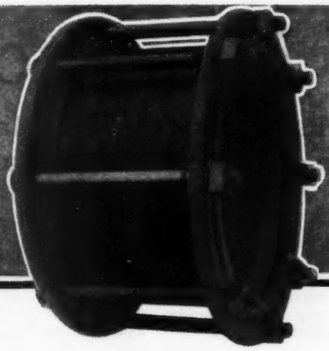

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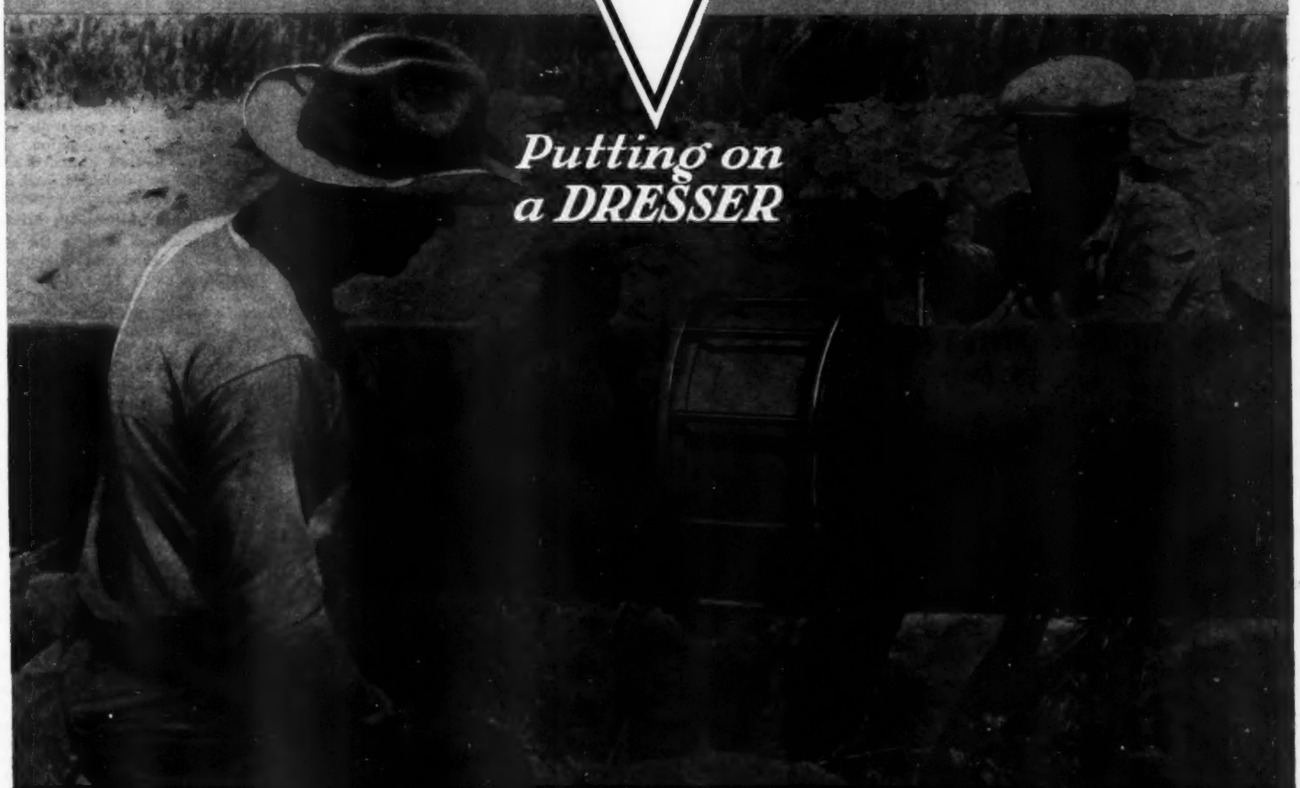


Putting on a DRESSER

DRESSER COUPLINGS *Dominate!*

Factors in the Manufacture of Grease

Discuss Merits of Different Base Materials in the Manufacture of Grades to Meet Variety of Uses

By F. M. Simpson and C. C. Wilch
Empire Oil & Refining Co.*

The technique and art of grease making has not failed to keep pace with the progress recorded by the refining industry, and today we find modern mechanical equipment and intricate manufacturing methods in force that represent marked advancement over operations of only a few years ago. The first grease was manufactured shortly after the discovery of oil in Pennsylvania, this being a crude type of axle grease made by mixing crude petroleum with rosin oil and then adding lime water which caused the mixture to harden after a few minutes. Later various types of fillers were added as thickeners and these crude greases gave lubrication to a large variety of rough or slow moving equipment. Grease making developed slowly from that state; however, within the past few years the improvements have been rapid and today we find steam jacketed, direct fire heated, and pressure kettles, pumps, filters, temperature controlled coolers, mechanical packaging equipment and many other devices entering into manufacturing methods.

There are a great many products termed greases; however, it is the intention here to discuss principally that classification of lubricating grease most conveniently defined as soap thickened mineral oils of semisolid and fluid consistency. The thickeners employed are metallic salts of a fatty acid of either animal or vegetable origin. This type of lubricant is, by far, the most widely adaptable, and deserves more specific consideration than other classifications of popularly termed greases now found in general use.

Greases may be classified, somewhat roughly, into the following three major groups:

1. Admixtures of mineral oil and solid lubricants.
2. Blends of residuum, waxes, uncombined fats, rosin oils and pitches.
3. Soap thickened mineral oils.

The first group (admixtures of mineral oils with commonly termed solid lubricants such as graphite, mica, sulphur, talc, asbestos fibers, etc.) in some instances is invaluable. For the lubrication of an ill-fitting machine part, functioning under a heavy, intermitting load, at slow speed, the filler or solid lubricant, absorbs the force of impact, preventing partial metal to metal contact. Furthermore, in functioning as a filler, the solid lubricant tends to smooth any roughness of contact surfaces which may be encountered.

Example of Types

Examples of the type are: Tractor roller lubricants and lubricants for railway car unloading devices, concrete mixers, mechapical digging equipment, etc. They usually consist of viscous mineral oils mixed with asbestos fibers, or other fillers with a lesser degree of hardness than steel, to the desired consistency. Graphite greases, a combination of soap-oil mixtures and the type under discussion, illustrate the adaptability of the filler principle.

The second group consisting of various mixtures of viscous mineral residuum and waxes, rosins, pitch, and uncombined fats, also possesses valuable characteristics. Lubricants of this type are especially suitable for rock bit lubrication, steel cable lubrication, water pump lubrication and dredges, chains, cranes and gears operating under water or exposed to the weather. The high specific gravity and high degree of metallic adhesion offer a protection against the operating conditions encountered.

In group three, the various thickeners employed include sodium, calcium, aluminum, lead, and less frequently, potassium and zinc soaps. The soaps are prepared by the saponification of a fatty glyceride of either animal or vegetable origin.

Soap-oil mixtures are diversified with respect to adaptability to lubrication requirements. The consistency, lubricating film strength, liquefaction temperature, degree of internal cohesion, and metallic adhesion, are especially required factors of modern lubrication and these factors are within control by scientific supervision of the grease making art.

"The Sliding Layer Theory" of lubrication assumes that the lubricant forms not only one film between the rubbing surfaces, but several, microscopic in dimension. The adhesion of the lubricant to the metal surface forms the initial film. Additional films are formed by the cohesive attraction within the lubricant body.

It follows, that for various rubbing speeds a greater or lesser degree of metallic adherence and body coherence is an essential factor of lubrication. It is readily seen that for high speed lubrication the cohesive property should not predominate, since it is a condition apt to cause momentary interruption of the lubricating film.

No method of test has been introduced for measuring the properties separately, but a study of the grease texture gives some indication of its relative qualities. A short shear or buttery texture, suggests a low degree of internal cohesion. With increased strength, the texture assumes a longer shear, graduating into an elastic or sponge-like structure.

Grease cannot be stubstituted for mineral oil to meet every lubrication requirement, but in many instances it is a more economical lubricant, by reason of its heavier body and higher resistance to flow. Consequently, less waste is encountered and the same lubricating results are obtained at a lower cost.

The essential restricting factor that applies to the use of grease as a lubricant for all purposes, issues from the fact that the soap forms an ash upon disintegration by combustion. The ash thus formed has an abrasive action on the parts to be lubricated, and also acts as a nucleus for excessive carbon deposit.

Ingredients of Soap-Oil Mixtures

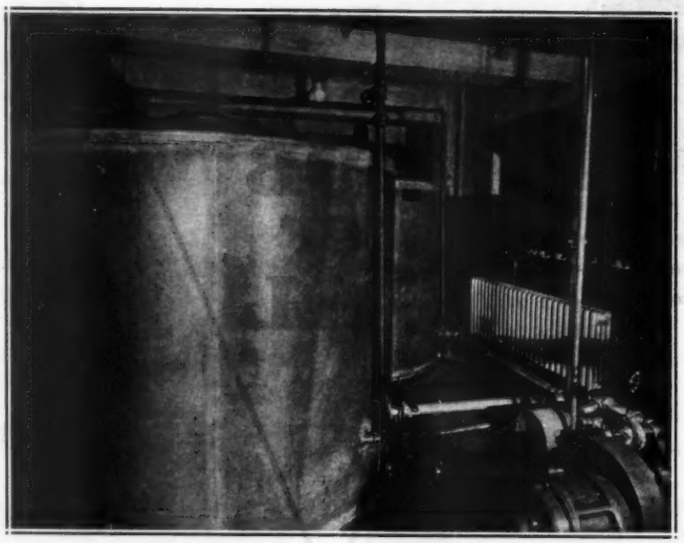
The ingredients used in the manufacture of soap thickened oils include the saponifying agent or metallic base, the saponifiable oil, and the mineral oil. The manufacturing procedure, in general, is to heat the saponifable oil in contact with the metallic base until the saponification reaction is completed. The mineral oil is then slowly worked into the hot soap until a grease of the desired consistency is made. There are some exceptions and variations to the general procedure which will be described later under the discussion of each soap type.

The saponifying agent or metallic base, obviously, determines the type of soap, and consequently plays a part in purposing the major characteristics and general physical properties of a grease product. Thus sodium and potassium soap greases are characterized by high solubility in water, and high liquefaction temperature; calcium or lime base greases by insolubility in water, and instability at high temperature with subsequent separation of oil and soap; lead and zinc soaps by high specific gravity and comparatively low melting point; and aluminum soap products by stability at high temperatures and brilliant, translucent appearance.

The type of saponifiable oil or fat is secondary to the saponifying agent, in importance to the construction of a grease product. The more specific properties, such as texture, degree of metallic adhesion, and cohesive character of the grease body, are controlled to a certain extent by selection of the fatty ingredient.

The grade and body of the mineral oil ingredient are largely responsible for the lubricating value of the grease product. Although viscosity is by no means a true index of lubricating value, it stands un-

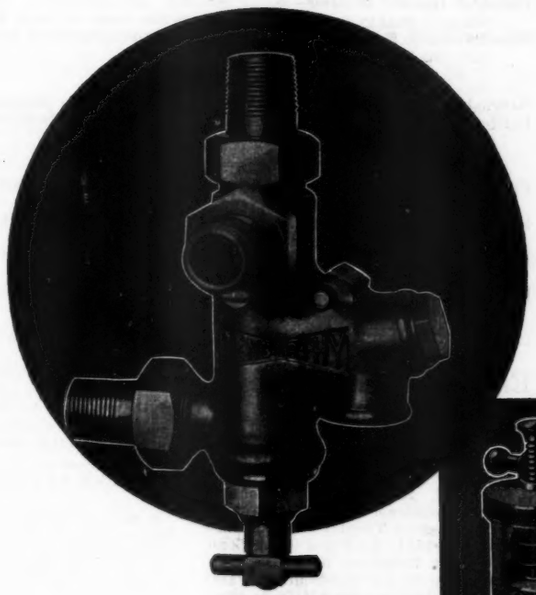
(Continued on Page 129)



One thousand gallon aluminum tanks used to store fatty acid. Aluminum is used in order to eliminate the possibility of discoloring the fatty acid which is later used in the manufacture of light colored greases.

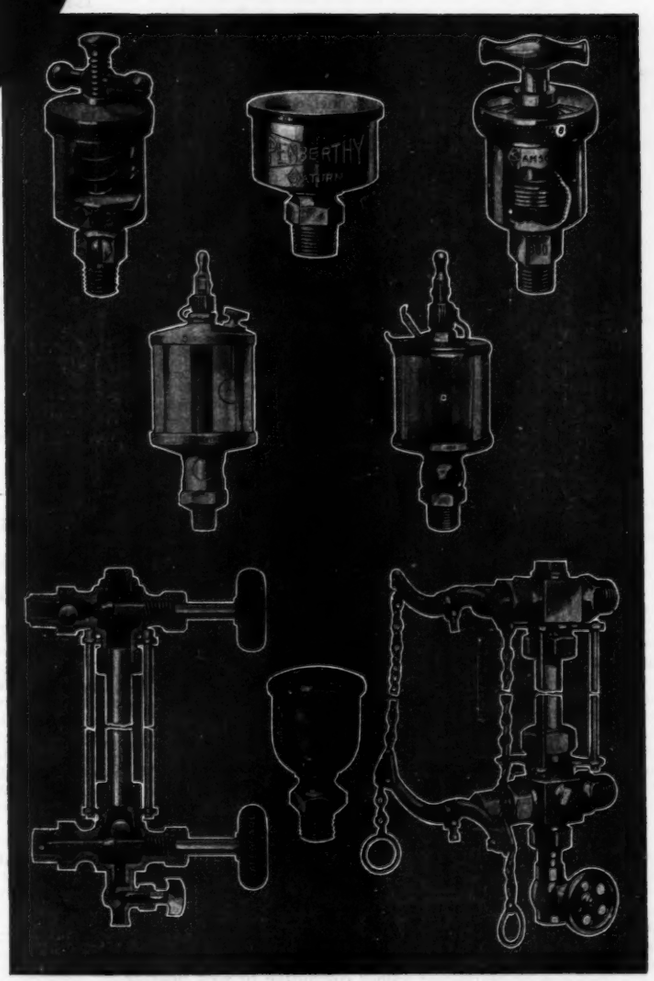
Pressure kettle of 300 gallons capacity for manufacture of greases.

*Presented before the Western Petroleum Refiners Association convention Excelsior Springs, Mo., March 10, 11 and 12.



ECONOMY SUGGESTS

PENBERTHY PRODUCTS



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East Texas Field May Ruin Many Oil Men If Not Tightly Curbed

Edwin B. Reeser, president of the American Petroleum Institute in an interview in Tulsa on Tuesday predicted that if the new fields in Rusk and Gregg Counties in East Texas are not curbed producers all over the Mid-Continent area will have to join in what will be a search for market outlet for their oil. Many operators in other parts of the Mid-Continent cannot survive if the new East Texas fields are not restrained, he said.

On the same day R. B. Whitehead, prominent Dallas Texas geologist, predicted that if proration is not put into effect in the new East Texas fields it would not only mean the ruination of many oil producers in other fields, but that more money would be spent in exploration and development in East Texas than oil men would ever get out of it and that crude oil might go to 25 cents a barrel.

Governors' Conference Recommends Matching Oil Supply and Demand

TEXARKANA, Tex., Mar. 10.—An agreement with major oil companies to limit production and importation of crude petroleum was recommended today by representatives of governors of seven states as the first step to be taken in restoring prosperity to the oil industry.

Representatives of the chief executives of Texas, Oklahoma, Louisiana, Kansas, California, Arkansas and Wyoming, meeting here yesterday on a call from Governor W. H. Murray of Oklahoma, made the recommendation as one of a number which might alleviate low prices, waste and distress among oil men.

They proposed that if agreements between the states and producing companies failed to curtail imports legislatures undertake to control imports within the states. At the same time they suggested that antitrust laws not be applied to a natural resource like oil or gas.

PURE CUTS VAN CRUDE

FORT WORTH, Tex., Mar. 10.—The Pure Oil Co. cut the price of Van crude to 43 cents for 29 gravity and below, with a 2-cent differential, making the top price 67 cents for 40 degrees and above. This order is retroactive to March 5.

Late Fields

OKLAHOMA

Otto Bradford, proration umpire of the Oklahoma City Field, has cited the Mid-Kansas Petroleum Co., Blackwell Oil & Gas Co., Jones Brothers Drilling Co., and Kedburg Oil Corp. for overproducing their wells in the Oklahoma City Field.

Phillips Petroleum Co.'s No. 1 Boulding-house, SW cor. NE NW, Section 10-11-3w, flowed 9,011 bbls. of oil in four hours from the Wilcox sand found at 6,326-6,505 feet. The gas was estimated at 36,000,000 feet a day. The well was produced under a back pressure of 200 pounds.

In the same pool Droppleman and others' No. 1 Lack, SW cor. SE NW, Section 30-8-8, found a showing of oil which rose 75 feet in the hole from the Wilcox sand at 3,980-83 feet. The test was being drilled deeper into the sand.

KANSAS

Agate Oil & Gas Co.'s No. 1 Rockefeller, SE cor., Section 6-13-12w, Russell County, a wildcat drilled by the Austin Oil & Gas Co. and recently sold to the above company, has resumed drilling after being shut down for several weeks. The test was drilling at 3,100 feet with little increase in the oil showing. When the test was first shut down it made 125

(Continued on Page 152)

SCORE SHEET ON OIL PRODUCTION

Below is shown allotted average daily production in the United States from October 1, 1930, to April 1, 1931, suggested by the American Petroleum Institute's special committee on the economic situation, and the actual daily average production during the week ending March 7:

	Allotted (bbls.)	Actual (bbls.)	Over (bbls.)	Under (bbls.)
Okla., Kans., S. W. Tex., N. Tex.*	953,700	921,081	.....	32,619
West Texas and S. E. New Mexico	316,300	278,317	.....	37,982
North Louisiana-Arkansas	86,400	89,185	2,785	.....
Gulf Coast	177,800	174,137	.....	3,663
Rocky Mountain	58,600	55,410	.....	3,190
California	530,100	526,000	.....	4,100
Other fields	110,600	111,500	900	.....
Total	2,233,500	2,155,630	3,685	81,555

Net average daily underproduction 77,870 bbls.
*North Texas includes North, Central and East Central Texas and Texas Panhandle.

Oklahoma Production Up 56,000 Barrels

Allowable Flow in Oklahoma City and Tests for Potentials in Greater Seminole Cause Increase

By W. A. Spinney
Staff Correspondent, Oklahoma Fields

The production of the Oklahoma City Field averaged approximately 128,250 bbls. a day for the week ending March 7, and is a new peak. During the same seven days the State's average production was around 501,000 bbls. a day, which is an increase of 56,000 bbls. a day over the previous week.

During the month of February the actual production of the Oklahoma City Field was 2,432,050 bbls. which is an average of 86,860 bbls. per day. The amount is considerably under the allowable flow, which was fixed from February 1 to 10, at 90,000 bbls. a day and from February 10 was increased to 125,000 bbls. a day.

During the week the Oklahoma City Field was quiet. Interest was centered on the proration situation at the state capitol. The Oklahoma Corporation Commission increased the allowable flow of the Oklahoma City Field 25,000 bbls. a day, raising the daily allowable flow to 150,000 bbls. Later on the same day the Stanolind Crude Oil Purchasing Co. reduced the price of crude oil in the Mid-Continent Field an average of 38 cents per barrel.

The Corporation Commission then postponed the order increasing the daily allowable flow from the Oklahoma City Field, until after the representatives of the oil-producing states had conferred at Texarkana.

Operators were permitted to produce the full allowable at all wells that were even with production, on March 1. The commission's order of February 10, increased the allowable in the Oklahoma City Field to 125,000 bbls. a day. The method of the flow was believed to mean all wells even with the proration would be permitted to flow only two-thirds of the allowable and the remaining one-third to be credited to the under-produced wells.

Commission's Order

The order decided on was as follows: "Be it remembered on March 5, 1931, the commission having had under consideration the application of Wirt Franklin and others, for an increase in the allowable takings from the Oklahoma City Field and announcement made in connection therewith from the bench at the conclusion of its hearing on March 4, 1931, and the commission having before it the request of the Governor of Oklahoma in connection therewith, which is in words and figures as follows: 'On yesterday you made an order increasing the flow of oil and placing a construction on the order heretofore made as to allowing only two-thirds of the field's allowable to be produced. Personally, I do not believe that the order was the direct cause for the reduction of the price but used as an excuse. I believe that the intention was to do so by certain big companies as soon as Congress adjourned. Therefore I would ask the commission to reverse the order placing the Oklahoma City Field back where it was prior to your order of yesterday and then that everything relative to oil both before the commission and before the legislature be held in abeyence until after the meeting to be held in Texarkana, on Monday, March 9.

"'It is my hope that at this conference there can be a plan worked out that will reach the situation. The sacrifice that must needs be made by the independent producers should be matched by the importers in a like sacrifice in importing oil. In other words, we should remove all excuse for reduction on the part of the state.'

"And the commission being further advised finds, That the request for staying action on the matter of increasing the allowable takings from the Oklahoma City Field should be granted and that action contemplating increased allowable takings should be delayed and held in abeyance until after the foregoing meeting of the several states' representatives in Texarkana, Ark., on March 9, 1931, and until such time as the commission may find it advisable to act hereon.

"It is therefore, ordered that the announcement of March 4, increasing the allowable takings in the Oklahoma City Field, be and the same is hereby revoked and held in abeyence until further order of the commission.

"It is further ordered that that part of the announcement specifically construing runs from even wells from the Oklahoma City Field for dates prior to March 1, 1931, is hereby rescinded and that the order pertaining to runs from even wells shall be construed only and permitting the full amount of runs from even wells from, on and after March 1, 1931, and that order No. 5,437, as construed herein be and remain in full force and effect until further order of this commission."

Six New Wells in Pool

Six wells were completed in the Oklahoma City Field during the seven days ending March 7, with an initial flush production of 13,754 bbls. of oil while they were open, which was an average of four hours per well. The principal work in the field at present is plugging back at the older operations, which, it is now believed were drilled too deep and went into water. In some wells water has flooded out the oil.

Ramsey's Sale at Wewoka

Announcement was made during the week of the sale of its half interest in 462 acres of leases in the Wewoka Townsite Pool, in Seminole County, to the Mid-Kansas Oil & Gas Co. by the Ramsey Petroleum Co. No consideration was announced but it is believed it was to be part cash and the balance in oil produced from the property. The acreage is located NW Section 30-8-8, on which four wells are producing with a potential production of 37,880 bbls. a day from the Wilcox sand and in Sections 19-8-8 and 24-8-8. The sale makes the Mid-Kansas Oil & Gas Co. the sole owner of the properties.

Potentials in Seminole

Companies operating in the Greater Seminole area started taking open flow potentials during the week at the request of the Oklahoma Corporation Commission. The wells in the different pools will be produced wide open for a 10-day period. The first group will be allowed to flow to capacity from March 5 to 15. The second group of pools will be produced from March 15 to 25. The results of the open flow test will be the potentials for the month of April. The first group of pools are the Allen (shallow and Wilcox), old Earlsboro, Earlsboro Townsite, Maud, Seminole, East Seminole, Searight and St. Louis. The second group of wells are in the East Earlsboro, Sasakwa, Bowlegs, Mission, Little River and the old settled production in the Carr City Pool.

The result from the first day's gauge indicates the field is still capable of producing almost double the amount it has been producing under proration and it is believed the wells have not suffered because of the strict proration plan. The first day's gauges from part of the area, taken on March 6, were as follows: Earlsboro Pool, 32,542 bbls. from 258 wells; Seminole, 27,506 bbls. from 254 wells; East Seminole, 2,680 bbls. from 33 wells; Searight, 8,671 bbls. from 82 wells; St. Louis, 42,164 bbls. from 472 wells, and Allen Field, 23,287 bbls. from 278 wells. The wells in the different pools are being produced by pumping, swabbing and air and gas lift.

The Konawa and Wanette Pools may be gauged April 1 to 10 to establish their potentials for the month of April.

New Wells in Tatums Pool

During the week two new producers were added to the Tatums Pool, in Carter County, southern Oklahoma. Carter Oil Co., E. B. Cox and J. L. Hamon's No. 2 Hooks, NE cor. SE NE Section 24-1s-3w, a new producer on the east side of the field, swabbed 1,610 bbls. of oil the first 24 hours. The oil sand was found from 1,842-2,055 feet. The well has been pinched in to 100 bbls. a day under proration. The second well completed was Magnolia Petroleum Co.'s No. 4 Dickerson, SE cor. NE Section 24-1s-3w, on the east side of the field. It swabbed 825 bbls. of oil the first 24 hours from sand at 1,931-2,055 feet. Same company has staked a location for No. 1 Burton, NW cor. SE NW Section 30-1s-2w, about a quarter of a mile southeast of production in the field. Same company's No. 1 McCrory, SE cor. Section 10-1s-3w, three-quarters of a mile northwest of production, was drilling at 3,700 feet with nothing showing.

Carter Oil Co.'s No. 1 Robb, NW cor. SW NW Section 19-1s-2w, is a new location on the east side of the field. The location is an offset to the same company's recently completed No. 2 Hooks.

Stephens County Developments

In Stephens County, L. Morrison and others' No. 2 Hightower, SW cor. NE Section 15-3s-5w, was rigging up to drill deeper. The well was completed as a 14,000,000-foot gas well at 737-63 feet. Same operators plan to drill No. 1 Hightower, NE cor. NW Section 15-3s-5w, another old gas well which was completed for 13,000,000 feet from sand at 700-36 feet.

A test in the Oil City Pool, Stephens County, was drilling deeper after finding a showing of oil. Crane & Rankin's No. 1 Adkins, NE cor. SE Section 14-1-9w, Stephens County, was drilling deeper at 3,005 feet. The showing of oil was found at 2,980-91 feet. Another sand was found from 2,880-2,925 feet.

In the Empire district of Stephens County a new location was announced during the week. G. Pace's No. 7 Bush, NE cor. SE NW Section 3-2s-8w, on the southwest side of the field, was a location. Same operators' No. 6 Bush was completed for 15 bbls. of oil.

S. B. Cooper and others' No. 1 Duncan, NW cor. NE Section 28-2s-7w, is being plugged and abandoned at a total depth of 1,755 feet after a production was made of the sand at 1,688-99 feet, where water was found. G. Pace's No. 10 McMaster, NW cor. SW NE NE Section 13-2s8w, was rigging up rotary tools.

P. Turner and others' No. 1 Andrews, NW cor. SW SW Section 5-2s-7w, a wildcat, has resumed operations after being shut down at 1,827 feet. Three other

(Continued on Page 128)

WILDCAT OPERATIONS IN OKLAHOMA

(Descriptions are East and North unless marked otherwise)

NORTHERN OKLAHOMA

ALFALFA COUNTY

Company, farm and location—	Remarks:
Smith Brothers' No. 1 Forbes, SE cor. NW NW Sec. 13-27-11w	Shut down 1,232 ft.
J. W. Bailey's No. 1 Acre, SW cor. NE Sec. 14-34-11w	Drlg. 5,285 ft.

BECKHAM COUNTY

Price-McFann's No. 1 Webster, C SW SW Sec. 34-8-26w	Drlg. 1,200 ft.
Mid-Continent's No. 1 Schaff, C NE SW Sec. 22-11-22w	Waiting on cement to set 430 ft.
Mid-Texas Co.'s No. 1 Sidell, NE cor. SW SW Sec. 17-2-22w	Shut down 2,550 ft.
White et al's No. 1 Green, SW cor. Sec. 34-10-24w	Shut down 2,830 ft.

BLAINE COUNTY

Washoma Oil Co. et al's No. 1 Phillips, C NW SW Sec. 13-19-10w	Pulling 6-in. csg. 4,590 ft.; rerun 6-in. csg.

CADDO COUNTY

Abernathy & Brown's No. 2 Houston, Sec. 24-6-13w	Shut down 1,115 ft.

COAL COUNTY

McGraw Oil Co.'s No. 1 Ward, NE SE Sec. 35-1-8	Shut down 250 ft.
Whitney et al's No. 1 Miller, SE NE Sec. 10-2-8	Shut down 760 ft.

COMANCHE COUNTY

Croy & Young's No. 1 Cline, NW NE NE Sec. 9-3-10w	Shut down 2,282 ft.
G. W. Stogner's No. 1 Doebel, C SW SW Sec. 3-3-9w	Shut down 1,450 ft.

CREEK COUNTY

Burton-Holmes et al's No. 1 Sankeye, SE SW SW Sec. 5-18-10	Red Fork sand 2,290-2,301 ft.; water; abnd.

GARFIELD COUNTY

E. L. Love et al's No. 1 White, SE cor. NW Sec. 9-24-6w	Drlg. 5,850 ft.

GRADY COUNTY

J. V. Bailey's No. 1 Hubbard, C NE NW Sec. 1-10-6w	Shut down 100 ft.
Holden's No. 1 Phillip, SE cor. Sec. 3-19-18e	Shut down 1,860 ft.
Marion Oil's No. 1 Sanders, NW NE NW Sec. 10-9-18e	Shut down 2,387 ft.

GARVIN COUNTY

Marlarnee et al's No. 1 Phillips, NE SW SE Sec. 24-2-2w	Location.

GREER COUNTY

French's No. 1 Murphy, SW NW Sec. 23-7-21w	Shut down 1,490 ft.

HARMON COUNTY

Harmon-Tex Oil Co.'s No. 1 Hoadley, NE cor. Sec. 17-4-24w	Shut down 2,593 ft.
S. M. Stauffer's No. 1 Castleman, SW NE Sec. 8-4-26w	Shut down 625 ft.

HARPER COUNTY

Empire's No. 1 Bruce, C NE SW Sec. 12-25-20w	T. D. 7,935 ft.; plugged back to 7,500 ft.
Sinclair Oil & Gas Co.'s No. 1 Howell, C SW SW Sec. 14-26-24w	20,000,000 ft. gas 5,350-5,400 ft.; total depth 8,539 ft.; shut down; sprayed 50 bbls. gasoline.

HASKELL COUNTY

Ault et al's No. 1 Harrison, CWL SE NE Sec. 14-9-19	Shut down 650 ft.
Ault et al's No. 1 Hall, NW SW SW Sec. 14-9-19	Shut down 2,000 ft.
Ault et al's No. 1 Hall, SE NW Sec. 25-9-19	Shut down 50 ft.

HUGHES COUNTY

Wright et al's No. 1 Ott, SE SW Sec. 15-5-11	Shut down 1,645 ft.

KAY COUNTY

Wilwright Gas Co.'s No. 1 Wildegrube, NE SW Sec. 14-27-1	Shut down 3,850 ft.
Lewis et al's No. 1 Harris, SE NW Sec. 14-25-1	Location.
Peters & Buckles' No. 1 Hayes, NW NE NW Sec. 24-28-3	Drlg. 2,600 ft.

(Continued on Page 156)

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Block Legalized Proration in Kansas

House of Representatives Passes Proration Law but Senate Committee Reports Adversely. Quiet Week in Field

By W. A. Spinney
Staff Correspondent, Kansas Fields

During the week attempts were made to enact a statewide proration law in Kansas, but it was blocked by the senate committee, which reported unfavorably, after being passed by the house of representatives. Members of the legislature, it is said, received more messages disapproving proration than for the support of statewide proration. The only proration in the State is managed by the oil companies and remains unchanged for the present.

Several important areas were opened with new wells during the week in different parts of the State and with the return of normal times in the oil industry several drilling campaigns may result. The State's daily average production for the week remained approximately the same as the previous week. The seven days ending March 7 shows production averaging 112,500 bbls. a day.

The Geddes-Carpenter oil proration bill was passed by the house of representatives early in the week and was sent to the senate. The bill provides for statewide proration and gives the Public Service Commission the power to stop drilling and regulate the production of all the wells in the State. It was patterned after the Oklahoma statute, with the addition of granting the commission power to stop drilling. The vote on the bill in the house was 80 to 21 in favor of its passage.

Silicious Lime in Elk County

The discovery of Silicious lime production in Elk County promises development in the southwestern part of that county. Operators are expecting a big yield from the deep formation. Others are expected to follow the discovery of W. M. Ferguson and others' No. 1 Ferguson, SW cor. NE NW, Section 23-30-8, which swabbed 135 bbls. of oil in six hours from the Silicious lime at a total depth of 2,912 feet, which is the top of the formation. The test was drilled to the Silicious lime on October 17, and has been shut in since that time without having a production test. The well is still without a market outlet and is shut in until a pipe line connection is obtained.

Roth & Faurot's No. 1 Smiley, SE cor. NW, Section 12-32-4, Cowley County, extended production in the Winfield area, flowing 216 bbls. of oil the first 12 hours from the Oswego lime at 2,556-88 feet. The well indicates the possibilities of the Oswego lime in the area and when the market is normal considerable drilling activity is expected to follow the completion of the well.

In Ritz-Canton Field

During the week another test in the Ritz-Canton area found oil in the Viola formation. Youler and Shell Petroleum Corp.'s No. 1 Sellers, SW cor., Section 19-19-1w, found the first oil at 3,412-25 feet. The oil rose 2,800 feet in the hole in a few minutes. The operators were preparing to drill deeper before making a production test.

Stearns & Streeter and United Petroleum Co.'s No. 1 Blair, NW cor., Section 32-19-1w, Ritz-Canton area, McPherson County, is preparing to drill deeper from a total depth of 3,072 feet. The test had 4,500,000 feet of gas at 2,970 feet and water and oil at 2,990-3,010 feet. It will be drilled to the Viola lime.

Gypsy Oil Co.'s No. 1 Coleman, C SW NE, Section 25-17-25w, Ness County, in western Kansas, may be abandoned without reaching the Wilcox sand on account of a fishing job. The tools were lost at a total depth of 4,160 feet. The test was expected to be carried to 5,000 feet or to the Wilcox sand. All efforts to recover the tools have proved unavailing as the drill pipe is frozen in the hole. Several times the fishing crew has had hold of the tools, but after jarring and pulling have been unable to budge them a fraction of an inch.

Skelly Oil Co.'s No. 1 Cone, NW cor. NE, Section 32-23-3w, in northern Harvey County, is being abandoned at a total depth of 3,872 feet. The test found gas in the chat at 3,240-41 feet, and oil at 3,297-3,312 feet and water at 3,340-50 feet. The Simpson sand was found at 3,764 feet and the Silicious lime at 3,838 feet, with a hole full of water at 3,872 feet.

The second wildcat test in Rooks County was spudded during the week, Billings and others' No. 1 Livengood, in Section 11-9-16w. The test is located a half mile north of the Vickers Petroleum Co.'s discovery well in the Natoma Pool, in the southeast part of the county.

In the Eastborough Pool

Another test is being started in the Eastborough Pool, in Sedgwick County, by the Magnolia Petroleum Co. on the Wheeler lease in the northeast part of the field. This test is No. 4 Wheeler, NW cor. SE SE, Section 19-27-2. There are three other producers on the lease.

The Derby Oil Co. is starting No. 5 Eastborough estates, NE cor. SW NE, Section 19-27-2. The test is the west offset to the Magnolia Petroleum Co.'s No. 4 Wheeler.

Other tests in the Eastborough Pool, nearing completion in the pool were Eisenhour Brothers' No. 1 Hoard, NW cor. SW NE, Section 19-27-2, which was drilling at 2,952 feet expecting the chat. The test is located approximately in the center of the Eastborough estates, two locations north of the Fisher & Lauck's No. 3 Trustee, which made around 1,000 bbls. a day when completed.

Continental Oil Co.'s No. 1 Nagel, SE cor. NE NW, Section 19-27-2, was completed during the week pumping 125 bbls. a day. The test of O. J. Connell and others, No. 1 Heckard, SE cor. NW, Section 18-27-2, a half mile north of production, has resumed drilling operations.

West of Burrton along the boundary of Reno and Harvey Counties on the trend of the Abilene arch on which the Voshell Pool, in McPherson County, is located, is expected to be the scene of considerable development, as new tests are being started or are expected to be in the near future.

The area comprises the territory in northeastern Reno County and the northwest part of Harvey County, where interest is being shown by large oil companies and the independent operators.

The area was core drilled by the Shell Petroleum Corp. about four years ago and it is believed to located favorably on structure. Some leases and royalty has changed hands during the interval and the Continental Oil Co. is expected to drill a test in the SW cor. SE SE, Section 23-23-4w. Northwest of the location the recent discovery of oil and gas by Study, Turner, Frost and Lloyd in Section 1-23-4w, on the same trend of folding, indicates the presence of petroleum deposits.

Over the county line in Harvey County, Frank Hollow is starting a test well at No. 1 fee, SW cor. NW, Section 20-22-3w. The test is located between two producing wells. At the present time the area is without any pipe line outlet, but as soon as facilities for handling the crude is made other tests are expected to be announced.

Core drilling in the State has been active but at the present time only 22 core drills are in operation. Subsurface geological work is also slowing down. Core drills are at work in Kiowa, Barber, Gray, Finney, Lane, Rice, Pratt, Gove, Stafford, Norton, Reno, Clark and Harper Counties.

The newest area to be core drilled is Harper County it being located west of Sumner County in the south central part of the State. The Indian Territory Illuminating Oil Co. has recently moved machines into the area. Carter Oil Co. has been coring in Ford and Clark Counties, and is now preparing to explore Barber County. National Refining Co. has been coring in Gray County in the area west of Dodge City. Other companies engaged in core drilling in the State are: Western Petroleum Exploration Co., Mid-Kansas Oil & Gas Co., Gypsy Oil Co., Carter Oil Co., Empire Oil & Refining Co., National Refining Co. Empire Oil & Refining Co. has been coring in Norton County in the northwestern part of the State.

The last core drilling in Sedgwick County was in the southern part of the county by the Wentz Oil Corp. in Townships 29-1, 29-1w, about 4 miles from the nearest production.

Ford County

Carter Oil Co. and others moved the rig in for No. 1 Everett, C NE, Section 22-29-21w.

Gove County

Johnson and Atlantic Oil Producing Co.'s No. 1 Wright, C SE NE, Section 11-12-27w, has been abandoned at 4,861 feet.

Harvey County

F. H. Hollow's No. 1 School Lot, SW cor. NW, Section 20-22-3w, is moving in. Cosby, Dietrich and Phillips Petroleum Co.'s No. 1 Cone, NW cor. NE, Section 31-22-3w, has been abandoned at 3,872 feet. Washoma Oil & Gas Co. and Shell Petroleum Corp.'s No. 1 Zook, C NW SW, Section 36-22-2w, made 700 bbls. from chat 2,965-3,000 feet.

McPherson County

Moriarty and others made location for No. 1 Anderson, C NW SW, Section 2-19-2w. Wolf Creek Oil Co. and Sinclair Oil & Gas Co. staked location for No. 1 Krehbiel, NE cor. NW NW, Section 25-19-2w. Reynolds & Unryn and Shell Petroleum Corp.'s No. 1 Koehn, SE cor. NW SW, Section 36-19-2w, is moving in tools. Lario Oil Co. and Shell Petroleum Corp.'s No. 1 Sellers, SW cor. NE, Section 31-19-1w, is a rig. Helmerick & Payne's No. 2 Koehn, NE cor. SE, Section 12-20-2w, is a cellar. McPherson Oil & Gas Development Co.'s No. 1 Salthouse, C SE, Section 15-19-2w, has been completed for 3,500,000 feet of gas in chat 2,925-2,970 feet.

Reno County

Shell Petroleum Corp. and others' No. 1 Blake, SW cor. SE SE, Section 23-23-4w, is a rig. Study & Turner and others' No. 1 Houry, SE cor. NW, Section 1-23-4w, has been completed for 337 bbls. in chat 3,254-3,365 feet.

Russell County

Stearns & Streeter and others' No. 1 Miller, SW cor. SE SE, Section 30-14-13w, is a rig on the ground.

Sedgwick County

Derby Oil Co. made location for No. 5 Eastborough, NE cor. SW NE, Section 19-27-2. Magnolia Petroleum Co. is erecting the rig for No. 4 Wheeler, NW cor. SE NE, Section 19-27-2. Continental Oil Co.'s No. 1 Nagel, SE cor. NE NW, Section 19-27-2, has been completed for 180 bbls. in chat 2,989-93 feet. Benson and others' No. 1 Carlton, SE cor. SW, Section 24-28-1, has been abandoned at 3,375 feet.

WILDCAT OPERATIONS IN KANSAS

(Descriptions are East unless marked otherwise)

Company, farm and location—	Remarks:
BARTON COUNTY	
Syndicate Oil Co.'s No. 1 Boertz, NW SE SE Sec. 13-18-12w	Drlg. 720 ft.
Skelton Oil Co.'s No. 1 Ott, C SE SE Sec. 16-19-14w	Shut down 2,065 ft.
McCool et al's No. 1 Tsern, NW SE NE Sec. 12-20-11w	Shut down 1,600 ft.
CLARK COUNTY	
Watchorn's No. 2 Morrison, NW NE Sec. 20-32-21w	T. D. 6,909 ft.; plugged back to 6,530 ft. to test show gas; S.D.
CLAY COUNTY	
Crystal Oil et al's No. 1 Tivier, SW cor. Sec. 19-8-2	Shut down 2,390 ft.
COFFEY COUNTY	
Heyburg's No. 1 Kroft, SE SW SE Sec. 30-22-14	Shut down 1,300 ft.
Roberts et al's No. 1 Hay, SW SE NW Sec. 32-22-15	Shut down 1,250 ft.
COWLEY COUNTY	
Fisher et al's No. 1 Hurt, C SW SE SE Sec. 11-34-3	Rig.
Roth & Farout's No. 1 Reedy, SW NW NE Sec. 8-32-8	Shut down 1,040 ft.
Tom Fine's No. 1 Boyd, NW NE Sec. 23-32-4	Shut down 2,650 ft.
DICKINSON COUNTY	
Severs et al's No. 1 Lavengood, NE SW Sec. 13-13-2	Shut down 3,850 ft.
ELLSWORTH COUNTY	
Gilmore Oil et al's No. 1 Sturm, NW SW Sec. 31-17-9w	Drlg. 600 ft.
Hershey et al's No. 1 Schultz, C NE Sec. 9-14-8w	Rig.
Alyward et al's No. 1 Stratman, SE NW SE Sec. 1-17-10w	T. D. 610 ft.; shut down.
Aladdin Pet.'s No. 1 Stoddenberg, C SW Sec. 22-16-10w	Shut down 1,130 ft.
Milton et al's No. 1 Kester, SE NE Sec. 6-14-9w	Shut down 1,476 ft.; making 2,000,000 ft. gas.
FORD COUNTY	
Carter Oil Co.'s No. 1 Everett, C NE Sec. 22-29-21w	Rig.
Swain et al's No. 1 Taylor, C NW Sec. 21-25-24w	Shut down 4,575 ft.
GOVE COUNTY	
Johnson and Atlantic's No. 1 Wright, SE NE Sec. 11-12-27w	T. D. 4,865 ft.; abnd.
GRAHAM COUNTY	
Schleimeyer et al's No. 1 Clark, SW NE NE Sec. 11-9-25w	Plugged back to 3,397 ft.; drlg. deeper; 3,715 ft.
GREENWOOD COUNTY	
T. K. Simmons' No. 2 Barnard, SW SE SE Sec. 19-22-12	Abandoned 1,925-65 ft.; water.
HARPER COUNTY	
Beeler et al's No. 1 Bear, C NE Sec. 21-36-6w	Shut down 1,830 ft.
HARVEY COUNTY	
Empire-Shell's No. 1 Showalter, NW SE Sec. 23-23-2w	Drlg. 1,985 ft.
KINGMAN COUNTY	
Skelly Oil's No. 1 Miles, NE cor. Sec. 30-27-10w	1,635-40 ft. 2,000,000 ft. gas; at 2,005-20 ft. 6,000,000 ft. gas; at 2,133-42 ft. 3,000,000 ft. gas; showing oil 3,385 ft.; T. D. 3,441 ft.; S. D.; estimated at 600 bbls. a day.
LYONS COUNTY	
Griffith et al's No. 1 King, NW cor. Sec. 8-19-10	Shut down 910 ft.
MARION COUNTY	
Midwell's No. 1 La Master, NW cor. Sec. 31-22-4	Shut down 650 ft.
MORTON COUNTY	
Hydraulic Oil Co.'s No. 1 State Land, NW SE Sec. 22-34-43w	Fishing 5-in. csg. 2,460 ft.

(Continued on Page 116)

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Not An Oil Well Reported in Louisiana

For Second Successive Week State Fails to Provide a Producer and Only Two Successful Gas Completions Are Recorded

By D. H. Bancroft
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., Mar. 9.—Gas in a Concordia Parish, Louisiana, wildcat; a wildcat in Panola County, Texas, and one in the deep gas area on the southwest flank of the Bellevue Field of Bossier Parish, Louisiana, featured the week's developments. For the second successive week, the entire division failed to furnish an oil producer and there were only two successful gas completions, both in the Richland gas area. The fatalities were heavy among the wildcats, principally in Zwolle territory, where three attempts to extend the field resulted in failures.

Probably the most important development was the gasser in Concordia Parish, where it appears, after numerous failures, commercial production may be obtained. This test, United Gas Public Service Co.'s No. 3 Saunders, Section 42-8-10, tested an estimated 3,000,000 feet of dry gas with drill stem tester at a depth of 1,438 feet. Nine-inch casing has been cemented at 1,400 feet, total depth 1,438 feet, and completion is expected in the next few days.

This area attracted attention several months ago when A. C. Glassell's No. 1 Pittsfield, Section 41-8-10, blew in for an estimated 5,000,000 feet with several thousand barrels of water, but was later deepened and abandoned as a dry hole at 2,434 feet. Since the blowout in the No. 1 Pittsfield, the United has drilled three tests and the Arkansas-Louisiana Pipe Line Co., one, all of which were failures.

Gasser Catches Fire

The Panola County gasser, the Everett Production Co.'s No. 1 McDaniels, blew in while drilling at a depth of only 398 feet. It immediately caught fire and started cratering. When it first came in it was estimated to be making 2,000,000 feet of gas and about 1,500 bbls. of fresh water. It has continued burning and has formed a crater about 25 feet in diameter. The gas, however, has decreased steadily and it is now estimated to be producing only 500,000 feet. This test is located in the Alanson Barr Survey, northwest of Tenaha, Tex., near the Panola-Shelby County line. It is reported that leasing is active in the vicinity of the well.

H. I. Morgan and others' No. 13-B Kendrick, Section 22-19-11, Trinity gas area, southwest of the Bellevue Field in Bossier Parish, blew in while drilling at 1,702 feet for an estimated 20,000,000 feet of gas and blew wild for a short time, but 33 thribbles of drill stem were cut loose and dropped in the hole and the well soon bridged over. It is now waiting orders. This gas was encountered higher than in any other well Morgan has drilled in this vicinity. He has completed several gassers on the same lease all of which obtained production from 1,780-2,000 feet.

In Caddo Parish, Simplex Oil Co. has made location and is rigging up for No. 1 Youree-Glassell, 500 feet north and east of center of Section 13-20-15, in the Pine Island district. Davidson and others' No. 1 Weiller, Section 33-17-13, wildcat about 5 miles south of Shreveport, tested dry with drill stem tester 1,802-1,942 feet and again at 2,055 feet and is now drilling at 2,061 feet.

United Deepening Hole

United Gas Public Service Co. has begun operations on its No. 1 Fortner, Section 5-22-16, about 1 mile southwest of production in the Rodessa district of Caddo Parish, and is drilling below 5,040 feet. This well was drilled to a depth of 5,002 feet by R. W. Norton about two years ago. United will carry it to the 5,600-foot level at which depth it has completed three gassers to the northeast. The same company's No. 1 Emmons, Section 27-23-16, Rodessa district, cemented 9-inch casing at 3,635 feet.

Louisiana Oil Refining Corp.'s No. 10 Langston, Section 19-21-7, a deep test in the Homer Field of Claiborne Parish, has reached the contract depth of 4,500 feet where it has been shut down and is expected to be abandoned. Arkansas-Louisiana Pipe Line Co.'s No. 1 Alexander, Section 47-8-9, Concordia Parish, in the area where United Gas Public Service Co. has the gas showing in No. 3 Saunders, already mentioned, has been abandoned as dry at 3,010 feet. Fred Stovall's No. 1 Grassmere, Section 23-8-10, same area, is drilling at 1,025 feet. Standard Oil Co.'s No. 6-A Farmer, Section 5-13-13, Holly district in DeSoto Parish, has been abandoned as a dry hole in red shale at 2,916 feet.

Daily Average Runs

A further decrease of 1,195 bbls. in daily average runs from Zwolle, a decrease of 275 bbls. from Urania with small decreases in other pools, accounted for a net decline in North Louisiana runs of 1,565 bbls. A decrease of 1,300 bbls. in daily average runs from Champagnolle coupled with a loss of 895 bbls. in Smackover heavy accounted for a decrease in Arkansas pools of 2,120 bbls. The decline from the division as a whole totaled 3,685 bbls. Daily average runs from the several pools were:

NORTH LOUISIANA

Caddo, light	7,965
Caddo, heavy	2,815
Homer	3,380
Haynesville	5,640
DeSoto-Red River	2,745
Elm Grove	520
Bellevue	590
Cotton Valley	1,805
Urania	4,610
Pleasant Hill	470
Sarepta-Carterville	1,600
Zwolle	8,530
Holly	580
Total	41,250
Last week	42,815
Decrease	1,565

ARKANSAS

El Dorado	3,810
Smackover, light	4,440
Smackover, heavy	32,635
Stephens	840
Nevada	1,000
Lisbon	780
Champagnolle	3,260
Bradley	60
Mount Holly	60
Urbana	1,050
Total	47,935
Last week	50,055
Decrease	2,120
Both states	89,185
Last week	92,870
Decrease	3,685

Talley Well Reports Gas Show

C. M. Talley and others' No. 1 Talley, Section 29-11-10, Natchitoches Parish, about 10 miles southeast of the Bull-Bayou Pool, made a drill stem test 1,256-69 feet in streaks of sand and gumbo, and report a small show of gas. They are arranging to set 6-inch casing with packer for a test. W. M. Coats' No. 1 Collins, Section 28-9-10, Natchitoches Parish, has resumed operations after being shut down for several months, and is drilling in lime at 3,870 feet. J. W. Cooper and others' No. 1 Cooper, Section 35-11-10, has also resumed operations after being shut down several months, and is coring in lime at 3,025 feet. Gulf Refining Co.'s No. 1 Bodcaw, Section 13-13-8, is coring in sandy lime at 3,892 feet.

In the Richland gas area, United Production Corp. completed No. 1-A Woolf, Section 35-17-6, at a depth of 2,448 feet where it gauged 37,944,000 feet of gas with a rock pressure of 910 pounds. The same company also completed No. 1-B Woolf, Section 34-17-6, at 2,450 feet, gauging 46,080,000 feet of gas with a rock pressure of 920 pounds. Arkansas-Louisiana Pipe Line Co. has begun drilling on its No. 5-C Thomason, Section 21-16-6, which is intended to be another relief well for its burning gasser at Alto. The burning gasser which was completed three years ago and immediately formed a large crater has been burning continuously during the last 20 months. It is planned to pump water through the relief well into the gas sand in an effort to check the gas flow in the wild well. Southern Carbon Co. has made location for a new test in the field, being its No. 1 J. O'Neal, C SW SW, Section 36-17-6e.

Loring to Make 6,000-Foot Test

The outstanding development in Zwolle for the week was the announcement by Loring Oil Co. of a location for a proposed 6,000-foot test for the field. This test, Loring's No. 16 Bowman-Hicks, is located approximately 1,000 feet south and 330 feet east of the northwest corner of Section 9-7-12, on the south central edge of the pool. It is planned to set 10-inch casing on the chalk rock, and if a large producer is not obtained in the chalk, to carry the well to the depth determined upon. There have been several tests drilled to 4,000-4,500 feet in and around Zwolle, one by L. M. Emlet in the same section as Loring's proposed test, which reached a depth of 4,070 feet. Completions in the area were failures, all outside the producing territory. Lawrence and others' No. 1 Hubley was dry and abandoned at 2,650 feet, this well being three-fourths mile southwest of production. Ten or eleven miles south of the pool, Wilson & Sons abandoned No. 1 Gandy-Garrett, Section 4-5-12, at 2,509 feet, and 8 miles north of the field and 5 miles southwest of the Pleasant Hill Field, D. H. Riddick, trustee, abandoned No. 1 Scretchfield, Section 18-9-12, at 3,260 feet. P. & G. Oil Co. decided not

(Continued on Page 127)

WILDCAT OPERATIONS IN LOUISIANA-ARKANSAS

(Rotary operations unless otherwise designated)

NORTH LOUISIANA

BIENVILLE PARISH

Company, farm and location—	Remarks—
Coyle Bros.' No. 1 Lawhon, 300 ft. N, 300 ft. E, SW cor. SE NE, Sec. 15-16-8	S.D. for csg; T.D. 2,866 ft.

BOSSIER PARISH

Andrews & Davlin's No. 1 Nattin, 100 ft. N, 250 ft. W, C, Sec. 15-22-14	Drlg. chalk 2,250 ft.
H. I. Morgan's No. 13-B Kendrick, 2,840 ft. E, 1,320 ft. W, SW cor., Sec. 22-19-11	Blew out; estimated 20,000,000 ft. gas and bridged over; waiting orders; T.D. 1,702 ft.
Rombaugh et al's No. 1 Allison, SW SE, Sec. 10-19-13	Arranging to deepen; T.D. 1,600 ft.
R. O. Roy's No. 1 W. H. Hodges, C NW NW, Sec. 19-16-10	Drlg. shale and gumbo 1,100 ft.

CADDO PARISH

R. E. Davidson et al's No. 1 Weiller, Sec. 33-17-13	D.S. test dry 1,802-42 ft; drlg. 1,-961 ft.
Garry M. Gordon's No. 1 Hatcher, 560 ft. E, 600 ft. S, NE cor. NW, Sec. 11-17-15	Location.
R. H. Libby's No. 1 Foster (was Gooch et al's), Sec. 29-15-16	Drlg. 2,910 ft.
Pyramid O. & G. Co.'s No. 1 Wheeler, 3,200 ft. W, 75 ft. N, SE cor., Sec. 9-18-16	Drlg. 1,380 ft.
United Prod. Co.'s No. 1 Emmons, 1,327 ft. E, 660 ft. N, SW cor., Sec. 27-23-16	Cmtd. 9-in. csg. 3,635 ft.
United Gas Public Service Corp.'s No. 1 Fortner, 330 ft. S, 330 ft. E, NW cor., Sec. 5-22-16	Drlg. 5,040 ft.

CALDWELL PARISH

Carter Bell's No. 1 Taylor, 150 ft. S, 150 ft. E, NW cor. NE SE, Sec. 17-14-4	Derrick.
Hudson et al's No. 1 Burton, Sec. 35-12-2e	S.D; shale 2,561 ft.

CATAHOULA PARISH

National Drlg. Co.'s No. 1 Marsh McMiller, 70 ft. N, 100 ft. W, C, Sec. 26-9-6	S.D. 3,086 ft.

(Continued on Page 171)

LOUISIANA-ARKANSAS PROVEN AREAS

NORTH LOUISIANA

BOSSIER PARISH—CARTERVILLE

Company, farm and location—	Remarks—
Del.-La. Dev. Co.'s No. 6 Bollinger, 330 ft. S, 220 ft. W, NW cor., Lot 17, in Lot 16, Sec. 31-23-11	W.O.S.R., T.D. 3,217 ft.

BOSSIER PARISH—SLIGO

United Gas Public Service Corp.'s No. 1 Smith, 1,980 ft. S, 342 ft. W, NE cor., Sec. 14-17-12	Drlg. shale 2,255 ft.

CADDO PARISH—GREENWOOD

Calatex O. & G. Co.'s No. 1 Edgar, 1,460 ft. S, 1,900 ft. E, NW cor., Sec. 17-16-16	Location.
Calatex O. & G. Co.'s No. 1 McAnn-Alfred, 1,310 ft. S, 970 ft. E, NW cor., Sec. 17-16-16	Location.

CADDO PARISH—MOORINGSPORT

Falcon Oil Co.'s No. 5 Nunnally, 2,379 ft. N, 3,849 ft. E, SW cor., Sec. 29-20-15	Drlg. chalk 1,750 ft.

CADDO PARISH—OIL CITY

Trio Corp.'s No. 1 Levee Board, 212 ft. S, 500 ft. E, NW cor., Sec. 17-20-15	Cmtd. 8-in. 1,320 ft; T.D. 1,605 ft.

CADDO PARISH—PINE ISLAND

Haynes Bros.' No. 2 Spell, 956 ft. W, 200 ft. N, SE cor. SE, Sec. 15-21-15	Fishing baller; T.D. 3,962 ft.
Simplex Oil Co.'s No. 1 Youree-Glassell, 500 ft. N and E, C, Sec. 13-20-15	Rig up.

CLAIBORNE PARISH—HOMER

La. Oil Ref. Corp.'s No. 1 Langston, 660 ft. S, 528 ft. E, NW cor. SW SW, Sec. 19-21-7	Drlg. lime 4,445 ft.

MOREHOUSE PARISH

Bahan & Bahan's No. 4 Feazel, 900 ft. W, 330 ft. S, NE cor., Sec. 2-20-4	Location.

OUACHITA PARISH

Jordan Drlg. Co.'s No. 7 Cole, 265 ft. S, 1,459 ft. W, NE cor., Sec. 49, in Sec. 50-18-4	Location.
United Carbon Co.'s No. 6 Spade, 1,180 ft. S, 140 ft. E, NW cor., Sec. 27-19-4	Location.

(Continued on Page 169)

ECONOMY!

* * *

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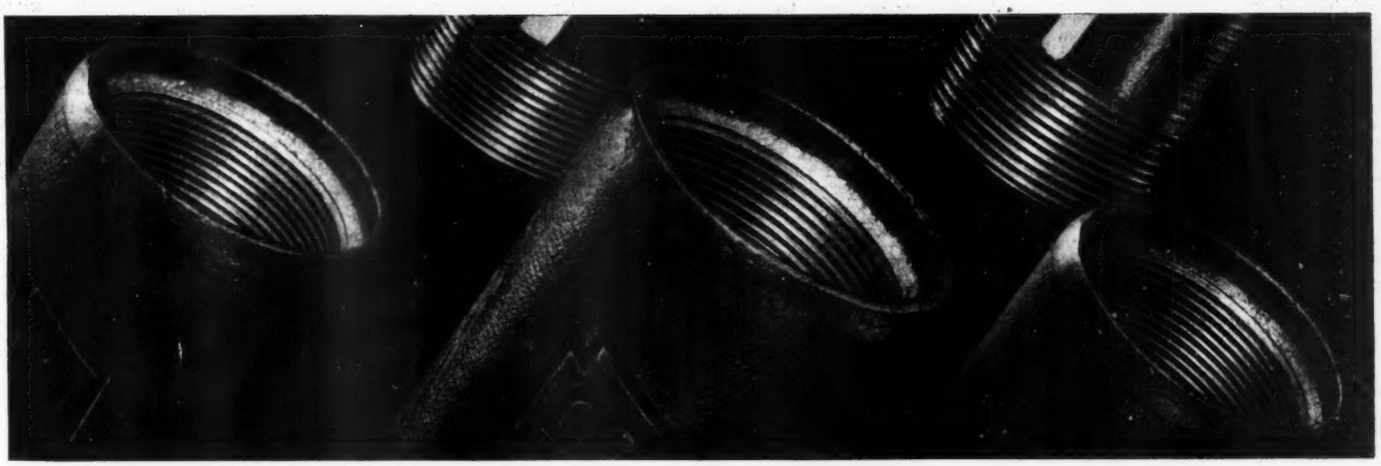

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AN INVESTMENT—NOT AN OUTLAY

Guesses in Southwest Texas Go Wrong

Third Failure in Northwest Duval County Among Developments of the Week That Did Not Turn Out According to Hopes

By B. D. Stevenson

Staff Correspondent, Southwest Texas Fields

SAN ANTONIO, Tex., Mar. 9.—Things did not turn out as operators had hoped in several spots over Southwest Texas the last week. The S.R.C. Oil Co. and Vacuum Oil Co.'s third effort at getting a well in the northwest corner of Duval County since bringing in the discovery well proved a failure but they have made location for another. T. B. Slick in Goliad County brought in a second test, the first since the discovery well, but, like other wells over Southwest Texas, the crude seemed to have gone through a subsurface cracking plant. It was much like gasoline.

United Production Co.'s No. 34 Ray, a 900-foot east extension of the Ray-McKinney Pool in the Pettus area in Bee County, came in for 15 bbls. an hour.

The Houston Oil Co.'s No. 4 Brown, in the Cartwright Field, which last week looked promising for a new sand at 4,846 feet, got the drill stem stuck and has not made much progress. The drill stem is loose now and the hole was cored 10 feet deeper with results yet unrevealed.

The gradual resumption of activity over Southwest Texas, which has been reported weekly since the first of the year, is still in evidence. The number of tests shut down or standing dropped to 89 last week from 91 the week before and from 115 the first of the year. Wells drilling increased from 111 the week before to 120 last week, the largest since the first of the year. Total operations listed, including locations where work has not yet started, also increased a little again last week. The principal increase seems to be in the counties east of the Laredo district and south of the Balcones fault counties, locally termed the Pettus and coast area.

T. B. Slick Pool

T. B. Slick estate's No. 1 Allen, the first test drilled in the new pool opened up in Goliad County at the end of the Christmas holidays, came in a well but is being deepened. It got production at the same depth as the discovery well, the No. 1 Poetter, at 4,212 feet, but instead of being a 500 to 1,000-bbl. well like the discovery, it came in for 60 bbls. of high gravity oil, almost gasoline, and much gas. It is hoped to better the oil production and the well is being cored deeper.

The No. 1 Allen is 1,500 feet east of the No. 1 Poetter or discovery well, and the operators have now made location for the No. 1 Riedel, 1,830 feet southwest of the No. 1 Poetter, in the W. C. Brown Survey.

South of the Slick Pool in the Pettus area in northern Bee County completion of United Production Co.'s No. 34 Ray, a 900-foot east extension of the Ray-McKinney Pool, was delayed through the drill stem getting stuck, but it is now in and flowing 15 bbls. an hour from sand at 3,945-54 feet, which is about the average depth of the wells in the pool. The company has moved 1,100 feet farther east and starting the No. 35 Ray. The No. 35 will be the fourth well the company has drilled to the east, feeling for the limits of the pool, the Nos. 14, 26 and 34 all having resulted in extensions, and if the No. 35 Ray results in a producer it will make a total extension east, almost in a straight line, of 3,500 feet.

The same company's No. 31 Ray is located midway between the Ray-McKinney Pool on the east and the Pettus Townsite Pool on the west and is about a half mile from each pool. Late in the week it had drilled 7 feet into sand topped at 3,962 feet and was preparing to set casing. The producing sand averages about the same depth in both pools and so it looks rather as though the two would ultimately be merged into one.

Kerr-Real Counties

There will be interest in Kerr and Real Counties this week. The Evans & Gants' No. 1 J. M. Auld, in Real County, 5 miles northwest of the No. 1 Jeff Love, discovery well in Kerr County, was at 3,190 feet last Saturday and at that point reduced the hole so as to have ample casing seat. The sand in the No. 1 Jeff Love is somewhere around 3,391 feet, there being a little uncertainty as to the exact depth of the well. The No. 1 J. M. Auld structurally is running about 10 feet lower than the No. 1 Jeff Love, but from identifications by the paleontologists is running about 125 feet higher. On the strength of this showing it is understood that acreage has been purchased around in that area, the Atlantic buying about 700 acres. Scouts and operators are sticking close to the proposition this week and sitting up with it in case anything happens.

Gant, Kilgore & Evans' No. 1 A. D. Auld, 4 miles southwest of the No. 1 Jeff Love, is down only 1,250 feet and lots of hole yet to make, and Evans & Gant's No. 1 Haby, 7 miles south of the Love well, is shut down at 1,156 feet. Evans & Gant's No. 1 Estelle Young, 5 miles north of the No. 1 Jeff Love, is erecting derrick, and Evans & Gant's No. 1 Seiker-Mears, 3 miles north and a mile east of the No. 1 Jeff Love, has a fishing job on at 285 feet. That completes the list of the tests drilling in the area.

Duval County

S.R.C. Oil Co. and Vacuum Oil Co.'s No. 3 Duval County Ranch Lands is dry and abandoned at 1,830 feet, the third dry hole since the discovery well came in at 1,730 feet late in 1930. The operators are moving to a new location 300 feet west of the discovery well. The discovery well came in for about 300 bbls. a day and the Magnolia Petroleum Co. extended its line to it. The No. 2 is 1,500 feet southwest and failed to get the sand and was abandoned dry at about 1,900 feet. The No. 3, located 300 feet northeast, got the sand of the discovery well but found it dry and tapped a new sand at 1,756 feet, which carried some oil but lots of salt water.

The Texas Company drilled the third dry hole 750 feet east and slightly south of the discovery well and got salt water at 1,747-54 feet and abandoned it dry at 2,531 feet. There is only one direction to move and that is west and the S.R.C. Oil Co. and Vacuum Oil Co. have moved 300 feet west of the discovery well for the No. 4 Duval County Ranch Lands. Pools in that part of the country usually follow a general northeast and southwest or else north and south trend similar to the trend of the Reynosa escarpment.

SOUTHWEST TEXAS PRODUCTION

Agua Dulce	19
Bexar County	349
Branyon	23
Bruner	15,381
Buchanan	100
Chapman	4,011
Dale	275
Darst Creek	27,849
Goliad County	45
Kingsville	121
Larremore	15
Luling	9,130
Lytton Springs	705
Manford	150
McMullen County	20
Medina	22
Minerva	404
Mirando district*	13,528
Normanna	35
North Pettus	283
Pettus	6,697
Saxet	181
Somerset	1,368
S.R.C.-Vacuum	147
Thrall	35
White Point	40
Yoast	180
Total	81,113
Week ended February 28	83,333
Decrease	2,220

*Includes Charco-Redondo, Jenninga and Mirando Valley of Zapata County; Albercas, Aviator, Caroline-Texas, Mid-O-Juelos, Schott and Wolcott, Webb County; Alworth, Henne-Winch-Fariss and Randado of Jim Hogg County; Cole, Driscoll, Kohler, Schoolfield-O'Byrne of Duval County.

Corpus Christi Area

In the Corpus Christi area the Houston Oil Co.'s No. 4 Brown in the Cartwright gas field in the southeast corner of Live Oak County, reported with a new sand at 4,846 feet, has been delayed by the drill stem sticking, but it is loose now and coring deeper, last depth reported being 4,856 feet. The No. 3 Brown has drill stem stuck at 5,573 feet.

Neuhaus' (Grimm & Yakey) No. 1

(Continued on Page 127)

SOUTHWEST TEXAS PROVEN AREAS

DOBROWOLSKI POOL—BEXAR COUNTY

Company, farm and location—	Remarks:
Morgan Bros.' No. 3 Masterson, 300 ft. S of No. 2 Masterson, Miguel Gortaris Sur.	T. D. 550 ft.; set csg.
Gatlin Oil Co.'s No. 2 Beck, Juan Montez Sur.	T.D. 300 ft.; drilling.
Gatlin Oil Co.'s No. 5 Beck, Juan Montez Sur.	T.D. 600 ft.; drilling.
Boiling & Michael's No. 1 Adams, Miguel Gortaris Sur.	T. D. 700 ft.; (W.O.).
F. H. Eckert's No. 10 Dobrowolski, 400 ft. from W line, 150 ft. from S line of lease, Sur. No. 52	Location.
A. J. Swearingen's No. 6 Sandemer, 600 ft. S of No. 1, M. Manchaca Sur.	Location.
A. J. Swearingen's No. 7 Sandemer, 300 ft. S of No. 6, M. Manchaca Sur.	Location.

BRUNER POOL—CALDWELL COUNTY

Joe Bruner's No. 1 Malone, A. Floyd Sur.	T. D. 50 ft.; spudded and shut down.

EDDINGTON POOL—FALLS COUNTY

Eddington et al's No. 3 Llewellyn, Geo. Allen Sur.	Rigging up.

DARST CREEK FIELD—GUADALUPE COUNTY

Gulf Prod. Co.'s No. 16 T. Dix, J. R. Robinson Sur.	T. D. 1,100 ft.; drlg. shale.
Humble Oil & Ref. Co.'s No. 23-A Denman	Rigging up.
Magnolia Petroleum Co.'s No. 1 M. E. Roamel, J. Robinson Sur.	T. D. 2,408 ft.; cementing cavings.
Simms Oil Co.'s No. 5 Manford, James Hodges Sur.	Rigging up.
Sun Oil Co.'s No. 1 Dowdy, J. C. Darst Sur. No. 9	T. D. 1,930 ft.; drlg.
Sun Oil Co.'s No. 14 Knoblock, midway between Nos. 9 and 2, J. W. Robinson Sur.	T. D. 1,900 ft.; drlg.

CHAPMAN POOL—WILLIAMSON COUNTY

Chapman's No. 4-F Sides, S. Miller Sur.	T. D. 1,844 ft.; completed 50 bbls.
Collins et al's No. 6 Lawrence	T. D. 1,670 ft.; completed; 65 bbls.
Collins et al's No. 8 Lawrence, S. Miller Sur.	Rigged up.
Vitex Oil Co.'s No. 8 Kilgore, Simon Miller Sur.	T. D. 1,735 ft.; waiting on cement.
Vitex Oil Co.'s No. 9 Kilgore	T. D. 1,550 ft.; drlg.
Westbrook et al's No. 8 Simmons	T. D. 1,335 ft.; set csg.

PETTUS AREA—BEE COUNTY

J. L. Mauldin's No. 1 fee, 1,300 ft. N of S line, 150 ft. E of Medio Creek, Kerr Sur.	T. D. 3,832 ft.; testing.
Houston Oil Co.'s No. 1, Blk. 33	T. D. 3,911 ft.; to be deepened.
Houston Oil Co.'s No. 1, Blk. 33	T. D. 3,914 ft.; to be deepened.
United Prod. Co.'s No. 32 Ray, G. Habbermacher Sur.	T. D. 3,925 ft.; drlg.
United Prod. Co.'s No. 31 Ray	Drlg. 3,150 ft.
United Prod. Co.'s No. 33 Ray	Location.
United Prod. Co.'s No. 35 Ray, 1,100 ft. east of No. 34, T. Hanson Sur.	Location.

(Continued on Page 121)

WILDCAT OPERATIONS IN SOUTHWEST TEXAS

ATASCOSA COUNTY

Company, farm and location—	Remarks:
Cullen and Boren's No. 1 Medina Irrigation, W. Klemke Sur. No. 439	T. D. 2,267 ft.; shut down.

BLANCO COUNTY

H. L. Lewis' No. 1 Glasscock, moving in to drill on leases out of the Rodson block north of Blanco City	T. D. 500 ft.; shut down.
Hardy-Sitton's No. 1 McMillan	T. D. 570 ft.; shut down.
Liles-Adams et al's No. 1 Stanford, 150 ft. to S line, 1,420 ft. to E line of James Stanford's No. 155	T. D. 952 ft.; drlg.
McCleary et al's No. 1 Schenling, 900 ft. to SE line, 600 ft. to S line of J. A. Rouse No. 118 Sur., 4 miles SW from Blanco City	T. D. 562 ft.; shut down.
J. R. Meek's No. 1 Walker, 360 rds. from W line, 482 rds. from S line of 376-ac. tract in Sur. No. 32	T. D. 1,025 ft.; fishing.
Page et al's No. 1 Cox, Rutersville College Sur. No. 18	Spudded and shut down.
G. Rosenfield's No. 1 Hohenberger, 800 ft. to W line, 1,250 ft. to N line, Sur. No. 94	T. D. 712 ft.; shut down.

BASTROP COUNTY

Majestic Pet. Co.'s No. 1 J. M. Breeding, 160 ft. from N line, 1,020 ft. from W line of 200-ac. tract, 940 varas from W line, 1,225 varas from S line of M. Andrews Sur., 13 miles W from Smithville	T. D. 375 ft.; standing.
Turner-Whorton and Anderson's No. 1 Harris, Joshua Gray Sur.	Ready to spud.

BELL COUNTY

Mildon Oil Co.'s No. 1 J. K. Edds, Maxiano Moreno Sur.	T. D. 400 ft.; drlg. chalk.
O. O. Alford and others' No. 2 F. Spankell, W. Woodford Sur.	Location.
J. W. Riley et al's No. 1 J. W. Mosely, Maxiano Moreno Sur.	T. D. 1,190 ft.; shut down; reinstated.

BROOKS COUNTY

Ed East's No. 3 B. Garcia, 150 ft. from N and W lines of Blk. 5, Share A-1, Las Mastena y Gonzalene grant	T. D. 1,002 ft.; standing.

BEE COUNTY

Hurlbut et al's No. 1 Mrs. D. Chestnut	T. D. 5,010 ft.; shut down.
Alexander and others' No. 1 McFail, 3 miles south Skidmore	Moving in.
Hicks and Patton's No. 1 Billingsley, B. Q. Hadley Sur., 1½ miles N Grayburg's No. 1-A Kimball	T. D. 1,855 ft.; drlg.
Catlell and O'Neill's No. 1 Miller, Ronald Hotchkiss Sur.	Location.

(Continued on Page 121)

IDEAL

"Reg. U. S. Pat. Off."

AUTOMATIC GRIP

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SPIDER SUB BASE

THE NATIONAL SUPPLY COMPANIES

Gulf Coast Records Few Completions

Results in Lowest Initial Production the Area Has Known in Years. One Deep Producer Completed in Sweet Lake Field

By Nell Williams
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., Mar. 9.—The addition of another deep producer in the Sweet Lake Field of Cameron Parish, Louisiana, was about the only development of interest from a new production standpoint in the Gulf Coast the last week. There were fewer completions than in any week for the last several years. Among the abandonments were deep wildcats on two geophysical salt dome prospects. Production of coastal fields also fell off noticeably during the week due chiefly to the slowing up of completions the past month.

The new Sweet Lake well was Pure Oil Co.'s No. 10 Yount Lee Oil Co., 4,402 feet south and 2,290 feet west of the northeast corner of Section 12-13s-8w. In the first 11 hours the well flowed 214 bbls. net oil, which was 75 per cent of the total fluid production, from sand at 6,805-30 feet. The flow was pinched to a three-eighths inch choke. Gravity of the oil is 27.5 degrees (corrected for temperature), temperature of the well being 72 degrees. Pressure of the well was only 220 pounds.

In view of the record made by this company's No. 9 Yount Lee Oil Co., located only 700 feet north of No. 10, the latter well so far has proved somewhat of a disappointment. No. 9 was completed last August flowing 1,357 bbls. on a three-eighths inch choke in the first 24 hours, and from the day of completion it has not varied in flow from around 1,100 bbls. daily of pipe line oil, an unusually consistent production record for a Gulf Coast well. These wells are in the same sand, and as the bottom of No. 10 is only 27 feet lower than in No. 9 and there being more sand in No. 10, a better well was expected. The pressure of No. 10 also is low for Sweet Lake. The pressure of No. 9 was 840 pounds on tubing and 1,550 pounds on casing and other wells in the field have had equally, if not greater, pressures.

Deepest Horizon Found at Sweet Lake

The horizon, in which Nos. 9 and 10 are producing, is the deepest which has been found at Sweet Lake, and these wells are the deepest which have been drilled there, not including Magnolia Petroleum Co.'s No. 1 Sweet Lake, Section 36-12s-8w, a wildcat drilled north of the field and abandoned at 7,505 feet last October. Sweet Lake however, has been a field of deep producers, the discovery well, No. 3 Yount Lee, being completed at a total depth of 5,897 feet. At the time of the completion of No. 3 in October, 1926, it was the deepest producer on the Gulf Coast, a record it held for two years. That well later was deepened to 6,198 feet, after being worked over several times, and finally abandoned. Since the opening of the field production also has been obtained in wells completed in a 4,600-foot horizon and at 5,500-5,600 feet and at 5,900 feet, but those wells have held up only a short time and at present Nos. 9 and 10 are the only producers.

Sweet Lake so far as known is not a salt dome field and generally is placed in a class with Goose Creek and Orange, where no domes have been found. However, it is possible all these three fields may overlie deeply seated salt masses. Sweet Lake on the other hand is not to be compared with Goose Creek and Orange in production as only seven wells have produced. Pure Oil Co., the only operator, has drilled a total of 10 tests, all of which have been in a comparatively small group, located in Sweet Lake, a large body of water. Magnolia Petroleum Co. owns a large block to the north and to the east of the Pure Oil Co. and has drilled one deep test (No. 1 Sweet Lake) on the north and is drilling a second, located on the east.

Trying to Make Another Well

Shell Petroleum Corp. late in the week was trying to make another well for Cameron Parish, this being on the Black Bayou Dome in the northwest corner of the parish. That was No. 16 Watkins, which was washing to test after setting 5-inch (O. D.) screen in sand at 4,193-4,213 feet. It is on the south flank of the dome, where three deep wells have been completed.

Gulf Production Co. has abandoned as dry its No. 1 Miller Vidor Lumber, first test drilled on the Vidor geophysical prospect, western Orange County, discovered during 1930 by the Gulf. The test, located 3,801 feet north along the west line from the southwest corner of the E. Lewis Survey No. 385, and 2,083 feet west at right angles from the line, was quit in sand and shale at 6,532 feet. No showings or indications of a salt dome were encountered in the test. It has not been determined whether a second test will be drilled in the immediate future.

Sloan Prospecting Co. has abandoned another interesting test on the Cedar Bayou geophysical prospect in eastern Harris County. This test, No. 2 Ulrich, Hannah Nash Survey, was quit in sticky shale at 5,510 feet. It is the fourth wildcat drilled on this prospect by this company, all of which have been in the same survey, located about 5 miles west of the Barbers Hill Dome. Showings of oil and gas have been found in part of these tests but not of sufficient volume to warrant testing. None of the tests has encountered cap rock or salt to prove the dome although the deepest has gone to 6,404 feet. A location is to be made at once for a fifth test but the definite location has not been determined upon.

No Completions in Three Active Fields

There were no completions in Barbers Hill, Refguio or Pierce Junction, the three most active fields on the Gulf Coast. As the holding up of Gulf Coast production is largely contingent on the bringing in of new wells, the failure of these fields, chiefly Barbers Hill and Refugio, the chief source of new production on the coast in the past year, to add to the completion list to any extent within the past several weeks has been reflected in the Gulf Coast production columns.

Total daily average production during the week which ended March 7 was only 174,137 bbls., a decrease of 3,977 bbls. Production in the majority of fields has been slipping off gradually for some time and only the steady increases at Barbers Hill and Refugio have offset the decline to maintain a fairly uniform coastal output from week to week. However, the last two weeks these two fields also have been on the decrease. Estimated daily average production by fields for the past week was:

GULF COAST PRODUCTION

Texas	
Allen	57
Barbers Hill	20,197
Batson	1,012
Big Creek	2,632
Blue Ridge	1,263
Brenham	144
Boling	698
Clay Creek	1,961
Damon Mound	581
DeWalt	11,893
Esperson	2,850
Fannett	567
Goose Creek	4,196
Hankamer	2,250
High Island	710
Hull	6,224
Humble	9,684
Lost Lake	310
Markham	189
Moss Bluff	345
Mykawa	169
Nash	218
North Dayton	621
Orange	1,953
Orchard	1,916
Pierce Junction	9,870
Port Neches	1,506
Raccoon Bend	9,244
Refugio	32,040
Rockland	4
Saratoga	978
Sour Lake	2,045
South Liberty	2,521
Spindletop	12,158
West Columbia	4,266
Total Texas Coast	147,282
Week ended February 28	150,199
Decrease	2,917
South Louisiana	
Anse La Butte	50
Bayou Blue	145
Bayou Bouillon	122
Black Bayou	982
Edgerly	486
Jennings	726
Hackberry	3,268
Iowa	Shut in
Lake Barre	2,934
Lake Pelto	107
Leesville	220
Lockport	4,726
Port Barre	1,807
Sorrento	42
Starks	760
Sulphur	1,797
Sweet Lake	1,117
Vinton	6,498
Welsh	42
White Castle	1,026
Total Louisiana Coast	26,855
Week ended February 28	27,915
Decrease	1,060
Total Gulf Coast	174,137
Week ended February 28	178,114
Decrease	3,977

In neither Barbers Hill nor Refugio has there been a let up of operations, although drilling has been confined to obligated tests and maintenance of old wells, and at this time tests in each field are on or near producing horizons and a new crop of wells should start coming in within the next week.

Of particular interest at Barbers Hill is Humphreys Corp.'s No. 1 Louise Fitzgerald, 350 feet from the north line and 60 feet from the west line of strip No. 7, Henry Griffith league, north side of the dome, which is in a sand showing oil at a total depth of 5,154 feet with 7-inch casing cemented. This test, in semiwildcat territory, is some 800 feet to the southeast of the company's No. 1 Morgan, discovery well of that area, which produced for a short time in sand at 6,404 feet but which later was abandoned. The Fitzgerald test is located closer in on the dome and drilled through salt at

(Continued on Page 128)

GULF COAST FIELDS AND WILDCATS

Week Ended March 7
All Rotary

BARBERS HILL—CHAMBERS COUNTY

Mills Bennett Prod. Co.'s No. 1-B Barber, north — Drlg. lime 4,942 ft.
Mills Bennett Prod. Co.'s No. 5 Higgins, southeast — Coring sandy shale 5,173 ft.
Mills Bennett Prod. Co.'s No. 2 Gulf-Fisher, Wm. Bloodgood Sur., 400 ft. from S line and 50 ft. from W line lease (workover) — Failed to pull screen 4,769 ft.; to sidetrack.
Humphreys Corp.'s No. 2-B Barber, north — Total depth 3,491 ft. in sandy lime; preparing to sidetrack stuck drill stem.
Humphreys Corp.'s No. 1 Louise Fitzgerald, north — Total depth 5,379 ft. in salt; sidetracked to oil sand 5,154 ft.; cmtd. 7-in. csg.
Humphreys Corp.'s No. 2 Wilburn, southeast — Drlg. shale and lime 3,320 ft.
Humphreys Corp.'s No. 1 Lula Barber, west flank, W. D. Smith Sur., 50 ft. from N line and 50 ft. from E line of tract — Drlg. gumbo, lime and boulders 3,361 ft.
Humphreys Corp.'s No. 1 E. H. Winfree, west flank, W. D. Smith Sur., 50 ft. from S line and 75 ft. from W line of tract — Drlg. shale and lime 3,344 ft.
Humphreys Corp.'s No. 2 E. H. Winfree, west flank, W. D. Smith Sur., 50 ft. from W line and 475 ft. S line 10-acre tract — Drlg. gumbo and lime 2,203 ft.
Humphreys Corp.'s No. 3 E. H. Winfree, west flank, W. D. Smith Sur., 264 ft. from S line and 50 ft. from W line of 10-acre tract — Rig.
Humphreys Corp.'s No. 4 E. H. Winfree, west flank, W. D. Smith Sur., 50 ft. from W line and 617 ft. from S line 10-acre tract — Derrick.
McAlbert Oil Co.'s No. 8 Woodward, east flank — Rig standing.
Rio Bravo Oil Co.'s No. 2 Fisher, west flank — Drlg. sandy shale and shell 3,507 ft.
Sun Oil Co.'s No. 8 Chambers, south — Drlg. salt 2,512 ft.
Sun Oil Co.'s No. 1 Smith, west — Drlg. shale 4,710 ft.
Sun Oil Co.'s No. 14 Wilburn fee, east — Rock 1,308 ft.; drill pipe stuck.
The Texas Company's No. 1 Williams, south west — Drlg. hard sand 6,928 ft.
The Texas Company's No. 2 Winfree, west flank, W. D. Smith Sur., 264 ft. N, 50 ft. W at right angles out of SE cor. of lease — Drlg. gumbo 2,446 ft.
The Texas Company's No. 3 Winfree, west flank, W. D. Smith Sur., 478 ft. N and 50 ft. W at right angles out of SE cor. of lease — Drlg. sticky shale 2,602 ft.
The Texas Company's No. 5 Wilburn, east flank, Wm. Hodges Sur., 400 ft. SW of No. 4 Wilburn and 50 ft. from SE line of lease — Derrick.
Yount Lee Oil Co.'s No. 10 Woodward, southeast — Drlg. hard sand 4,912 ft.
Yount Lee Oil Co.'s No. 16 Chambers, Wm. Bloodgood Sur., 50 ft. from W line of tract in line with Nos. 15 and 12 (workover) — Pulling screen to deepen 4,733 ft.
Yount Lee Oil Co.'s No. 18 Chambers, south flank, Wm. Bloodgood Sur., 100 ft. N Sun Oil Co.'s No. 7 — Drlg. sand and shale showing oil 4,129 ft.
Yount Lee Oil Co.'s No. 19 Chambers, south flank, Wm. Bloodgood Sur., 10 ft. N Sun Oil Co.'s No. 8 — Drlg. salt 3,820 ft.; top salt 1,807 ft.
Yount Lee Oil Co.'s No. 6 Phillips, east — Rig standing.
Yount Lee Oil Co.'s No. 1 Winfree, west — Drlg. sand, shale and lime 5,077 ft.
Yount Lee Oil Co.'s No. 2 Winfree, west flank, W. D. Smith Sur., 50 ft. from S line and 100 ft. from E line of tract. — Drlg. sand and lime 3,868 ft.

RACCOON BEND—AUSTIN COUNTY

H. R. Flannigan's No. 2 Dietrich — Drlg. sandy shale 3,541 ft.
Humble & Valley's No. 2-A Grawunder, Wm. White Sur., 1,100 ft. southwesterly from NE line in center of 72-acre tract — Location.
Humble & Valley's No. 8 Payne, Wm. White Sur., 675 ft. from NW line and 150 ft. from SW line of lease — Drlg. shale 386 ft.
Humble & Valley's No. 11 Payne — Drlg. sand showing oil 3,558 ft.
Humble & Valley's No. 12 Payne, Wm. White Sur., 500 ft. SE of No. 9 — Location.

(Continued on Page 123)

Eunice Area Extended to Northwest

Test Near Denver Shows Slight Increase in Gas. Midway Test to Be Drilled Deeper. Greasewood Development

By Tolbert R. Ingram
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., Mar. 9.—The Hobbs Pool in New Mexico now has one drilling well and the Eunice Pool in Lea County, has been put under proration. Atlantic Oil Producing Co.'s No. 1 Coleman, in the Eunice area, is making 15 bbls. per head every 45 minutes and extends the pool one-third mile northwest. Flynn, Welch & Yates had a duster in their No. 59 State in Eddy County.

Directors of the Platte Valley Petroleum Co. adjourned their meeting without signing any contracts for the development of their Colorado holdings. The Indian Territory Illuminating Oil Co. may install a rotary to complete its Fort Morgan test. The MacDeb Drilling Co.'s No. 1 Fitzsimmons, near Denver, has resumed drilling and showed a slight increase in gas. The Parker Club, Inc.'s Badito-Alamo test in Huerfano County has resumed. The Mountain Fuel Supply Co.'s No. 2 State, in the Hiawatha Field, unexpectedly ran into a gas sand and lost its rig by fire.

In Wyoming, the Midwest Refining Co. is preparing to drill deeper in its Midway test and the Ohio Oil Co. has found saturation in a Dakota sand in the Big Muddy. The Argo Oil Co.'s Lance Creek well is making 6,000,000 feet of gas.

Montana had a gas well fire in the Liquid Oil Co.'s No. 1 Roberts, in the Barthelote Field, which ran into a stray gas sand. A small gas well was completed in Hill County.

NEW MEXICO

Hobbs Pool—Lea County

The committee in charge of proration for the Hobbs Pool placed the allowable outlet for the first half of March at 31,395 bbls. daily, same as last half of February. The potential remains practically the same, 1,122,965 bbls. from 142 wells on 126 units of 40 acres each. Drilling operations are down to one well, the Gypsy Oil Co.'s No. 7 Grimes, SE NE NW, Section 32-18-38, drilling at 2,750 feet in anhydrite after cementing 13⅜-inch at 2,741 feet. National Securities Oil Co.'s No. 1 Linam, NE SE SW, Section 33-18-37, 4 miles west of the field, which ran into sulphur water at 4,265-72 feet, plugged back 22 feet and is bailing to test water shutoff.

Eunice Area—Lea County

The Eunice Pool, placed under proration late in February, is running 50 per cent of potential. Under the agreement, Continental Oil Co.'s No. 1-A Lockhart and No. 2 A. E. Meyers, two recent completions, are running 240 and 190 bbls. daily respectively.

Atlantic Oil Producing Co.'s No. 1 Coleman, SW NE NW, Section 17-21-36, one-third mile northwest of the four offsets in the center of the section, is drilling at 3,922 feet in lime and heading every 45 minutes. The heads last for about seven minutes and amount to around 15 bbls. It is also making 5,000,000 feet of gas with the oil while drilling continues. The first oil was at 3,826 feet. It is being drilled in with cable tools.

The California Co.'s No. 1 Meredith, SE cor. NE, Section 19-21-36, is drilling at 3,400 feet in lime and if a producer, will extend the pool one-third mile south of the Getty well.

Miscellaneous—Lea County

Western Drilling Co.'s No. 1 State, SE NE NE, Section 16-20-32, northwest of the Lea Pool, is drilling at 955 feet in salt. The 12½-inch was cemented at 935 feet; top of anhydrite 780 feet, top of salt at 830 feet, and elevation 3,460 feet. Same company's No. 1 State, NE cor. SE, Section 13-17-36, in the Lovington area, has cleared up its casing trouble and after cementing 15½-inch at 207 feet, is drilling in sand at 420 feet. Leonard & Levers' No. 1 Justis, C SE NE, Section 19-25-37, in the Jal area, is rigging up machine. Western Drilling Co.'s No. 1 Bridges, SE cor. NW, Section 17-17-34, in the Caprock area, which had 3,750 feet of oil at 4,757 feet, is drilling in lime at 4,860 feet and showed a small increase in gas at 4,850 feet.

Eddy County

Flynn, Welch & Yates' No. 59 State, NW cor., Section 5-19-28, in the Artesia area, found neither oil nor water in the Artesia pay at 1,971 feet and is being abandoned at 1,990 feet.

San Miguel County

Con-O-Kul Oil Co.'s No. 1 Stephenson, NW cor. NE, Section 34-17n-21, in Cherryvale district, is shut down at 430 feet waiting for 15½-inch casing, and Starr Oil Co., Ltd.'s No. 3 Adams, NE cor., Section 25-17-17, Dunken district, is making hole at 3,375 feet in what is believed to be the upper Pennsylvanian.

Luna County

Angelus Oil & Mining Co.'s No. 3 State, C NW SE, Section 20-21-10w, near Deming, is drilling at 6,027 feet in the Pennsylvanian. In the past 500 feet it has had several shows of gas in sandy black shale.

San Juan County

Continental Oil Co.'s No. 24, SW cor. NW, Section 1-29-19, Rattlesnake Dome, is bottomed at 4,730 feet and fishing. San Juan Leaseholds Co.'s No. 3 Bowman, NW NE, Section 30-30-15, Meadows district, is drilling below 2,615 feet. Kutz Canon Oil & Gas Co.'s No. 1 Day, SW cor., Section 20-28-10, Kutz Canon district, being carried to the Lewis shale after finding a little gas in the top of the Picture Cliff, is drilling at 2,400 feet.

UTAH

Utah Southern Oil Co.'s No. 1 Balsey, C NE NE, Section 31-23-21, Salt Valley, is shut down temporarily at 910 feet. Diamond Oil Co.'s No. 1, SE NW, Section 16-8s-5e, is drilling at 3,140 feet after a short shutdown.

COLORADO

Weld County

A meeting of the directors of the Platte Valley Petroleum Co. at Fort Morgan the past week to consider a drilling program, adjourned after being in session for several days without signing any contracts. It is expected another meeting will be called in about two weeks and in the meantime several proposals will be given careful study.

Morgan County

Indian Territory Illuminating Oil Co.'s No. 1 State, C NE NE, Section 16-1n-57, Fort Morgan anticline, is bottomed at 4,090 feet and cleaning out 140 feet off bottom. No new hole has been made for more than a month due to casing trouble and cavy ground. The string of 6⅝-inch was pulled and rerun all but seven joints. Reports that some oil was showing on the sump created excitement at Fort Morgan the past week, but an investigation disclosed this was oil from the Greasewood well poured in to lubricate the pipe. On account of cavy formations and a reduction in the size of the hole earlier than expected, a rotary rig may be installed to complete the well.

Lincoln County

Eastern Colorado Oil Co., which recently concluded a deal with the Kelly Oil Co. to complete its No. 1 State, SE cor. NW, Section 36-14-57, expects to be running tour this week. The hole has been standing at 3,380 feet with 4¾-inh at 2,450 feet. The bottom is estimated to be less than 100 feet off the first Dakota. It had some good shows of oil and gas.

Elbert County

J. M. Botts' No. 1 Buick, SE cor., Section 1-8s-59, near Agate, spudded in February, 1928, is expected to resume shortly. It found a sand at around 3,000 feet that had a good show of gas.

Washington County

Zimmerman and others' No. 1 Middlemist, SW SE, Section 14-4s-56. Middlemist Dome, is temporarily shut down at 1,510 feet.

Arapahoe County

MacDeb Drilling Co.'s No. 1 Fitzsimmons, NE, Section 7-4s-66, near the hospital at Aurora, resumed operations after being shut down since January 14 when a showing of oil at 5,735 feet was reported. At 5,745 feet there was an increase in the gas sufficient to whistle through the control head. No increase in the oil, of which about 250 feet was reported standing in the hole, accompanied the gas. C. A. Caruso, former secretary and treasurer, was elected president; George N. McPhee, vice president, and R. R. Bowles, secretary and treasurer.

Jefferson County

Ruby Hill Oil & Gas Co.'s No. 1 Braden, SE cor., Section 24-4s-69, is bottomed at 3,864 feet and cleaning out.

Adams County

Nettie M. Slatt's No. 1 Hills, SE cor., Section 27-3s-64, Watkins district, is drilling in shale below 2,508 feet. Gas continues in the shale.

Larimer County

C. Leonard Smith's No. 1 State, SE cor., Section 36-12n-70, Sand Creek, is drilling at 615 feet in hard lime. There was a show of oil at 600 feet. Standard Oil Co. of Colorado's No. 1 Hertha, NW cor., Section 21-4n-69, Berthoud Dome, is fishing for tools at a total depth of 3,792 feet with 3,000 feet of oil from the Muddy sand in the hole.

Huerfano County

Parker Club, Inc.'s No. 1 Fee, CNL NW SE, Section 4-28-68, Badito-Alamo Dome, shut down a year in the top of the Lakota at 4,115 feet, has resumed operations. Seven joints of 5-⅞-inch pipe will be sidetracked with 6-inch tools. A new string of 5-⅞-inch will be run and a test made of the oil in the Lakota.

Park County

South Park Oil & Gas Co.'s No. 1 Milligan, NE SE, Section 13-8s-76, Jefferson district, reported showing considerable noninflammable gas at a total depth of 1,810 feet, bridged the hole back and cemented 10-inch at 750 feet and is drilling out plug.

Moffat County

Mountain Fuel Supply Co.'s No. 2 State, SW SE NE, Tract 37-12n-100, Hiawatha Dome, in which Reiter-Foster Oil Co. has an interest, unexpectedly ran into a sand at 2,180 feet making a flow of gas estimated at 10,000,000 feet a day. The gas became ignited and the rig was burned. It will be rebuilt at once. The 13⅜-inch casing was set at 2,150 feet for a formation shutoff and the hole was being dried up to test a sand expected at 2,200 feet. The location is near No. 1

(Continued on Page 106)

SOUTH TURNER VALLEY DISTRICT EXTENDED BY 160-BARREL WELL

By Victor Lauriston
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, Mar. 7.—Complete production figures for Alberta for January show a total from all fields of 168,785 bbls. Of this, 162,113 bbls. came from the Turner Valley Field, 159,588 bbls. of naphtha and 2,525 bbls. of light crude. Red Coulee production totaled 5,959 bbls. of light crude. The Wainwright Field produced 360 bbls. of heavy crude, and the Ribstone Field 353 bbls.

In the South Turner Valley, Commonwealth Petroleums' No. 1, LSD 7, Section 9-19-2w5, has been shot with 300 quarts at 5,000 feet, 388 feet in the lime. The shot increased the wet gas flow and tested 160 bbls. It is an extension to the field a little east of a line between the East Crest producers on the north and the Mercury wells to the south.

In the Central Turner Valley area, Structure Oil & Gas' No. 1, LSD 7, Section 31-19-2w5, made 70 bbls. on early tests and adjustments of back pressure may increase this to 100 bbls. In Section 12-20-3w5, Illinois-Alberta Oils' No. 1, LSD 14, failed to develop satisfactory production after a shot in the lime. The 2 13/16-inch hole is being reamed out to 3⅞ inch. For several years it maintained a steady naphtha production of 100 bbls. In the same LSD, New McDougall-Segur Oil Co.'s No. 3 was shot at 5,800 feet, 380 feet in the lime, with wet gas flow increased by the shot.

Richfield Petroleums' No. 2, LSD 12-13, Section 13-20-3w5, is drilling around 4,245 feet with some wet gas and considerable light crude seeping from the Home sand. The Dalhousie sand is expected at 4,350 feet.

South Turner Valley

In the South Turner Valley, Mercury Oils has derrick up for its No. 6 test in LSD 12, Section 4-19-2w5, offsetting Hylo Oils' No. 1. Mercury's No. 5 is drilling at 5,998 feet. Samples are being analyzed to determine whether to carry the test any deeper. Production from Section 4-19-2w5 is holding up satisfactorily, Mercury's No. 1 making 588 bbls. and No. 3 making 179 bbls. recently, while Miracle Oils' No. 1 made 233 bbls.

Drilling by Imperial Oil, Ltd., is going steadily ahead on a number of tests. In the South Turner Valley, Southern Lowery's No. 1, LSD 3, Section 9-19-2w5, is still testing production after a shot in the lime at 4,857 feet.

Royalite Oil Co. has announced its seventh dividend of 50 cents a share, payable March 16 to shareholders of record March 5. The company is reported to have sold approximately 350,000 bbls. of crude naphtha and light crude oil in 1930, while considerable revenue was derived from gas sales.

Drilling in the Foothills

On the Waite Valley structure, Calgary Development & Producing Corp.'s No. 1, LSD 10, Section 21-19-3w5, is drilling 366 feet in the lime at 4,200 feet with no commercial production yet reported.

In the Aldersyde district, Ranchmen's Gas & Oil Co.'s No. 1, LSD 16, Section 13-20-29w4, is resuming after new installations. The test has been standing

(Continued on Page 127)

Verticals

-THEY MAKE HUSKY HELPERS

One of two Cooper-Bessemer 200 B. H. P. Vertical gas engines direct-driving 156 K. V. A. generators in Sterlington station of United Gas Company, Kline Spur, La.

Cooper-Bessemer 90 B. H. P. Vertical gas engine direct-driving 75 K. V. A. generator in Cole Bruni station of United Gas Company at Bruni, Texas.

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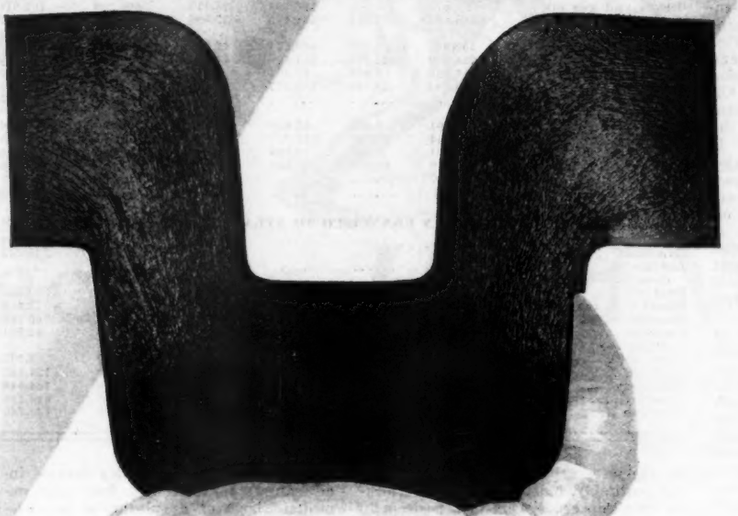

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-BESSEMER

California Suffering From Price War

Recovery From Demoralization Believed to Lie in Complete Stabilization and Limitation of Crude Production to Actual Needs

By L. P. Stockman
Staff Correspondent, California Fields

LOS ANGELES, Calif., Mar. 9.—Conditions on the Pacific Coast took a decided turn for the worse during the last week, due primarily to extension of the gasoline price war which started late in February, and this adverse condition prompted the Union Oil Co. to post a substantial reduction in the price of crude oil. It is declared that major refiners cannot compete with bootleg gasoline or motor fuel selling at cut rate prices on the basis of existing crude oil price schedules.

L. P. St. Clair, president of the Union Oil Co., predicted this price adjustment when he told stockholders at the annual meeting that a continuation of the present gasoline war would result in a collapse of the existing price structure of crude oil and might temporarily demoralize conditions. Commenting on the recent slashing of gasoline prices, he stated that general conditions were not different today from what they have been for the last six months and that no more reason exists for the cutting of prices at present than existed during the latter part of 1930. Not until the industry becomes completely stabilized and production of crude oil has been limited to the amount that actually can be absorbed can the periodic destructive upsetting of marketing conditions be avoided, Mr. St. Clair said.

The great disparity which has existed for more than a year between the posted price of crude oil and the value of refined oil has been a source of discussion. This difference has been unusually hard on refiners, especially the major companies which have been obliged from time to time to compete with cut rate gasoline. Many independent refiners were able to buy all the crude they needed at prices below market, while major companies continued paying high prices for raw material.

Curtailment Incomplete

The maintenance of high prices for crude oil has been justified on the assumption that producers of crude oil should be recompensed by a high price schedule because of their willingness to restrict production. Few question the fairness of such a position but curtailment of production has not been 100 per cent effective. The failure of some operators to curtail production has weakened the general price structure and this was further jeopardized by the selling of unrestricted crude oil below the general posted price for crude and substantially below its intrinsic value. Most producers who have rigidly adhered to curtailment work will be penalized because of the action of a small minority.

The crude oil situation became acute during the last 60 days through a combination of circumstances over which producers and refiners had had no control. Cancellation of crude oil contracts by the receiver in equity for the Richfield Oil Co. and the inability of other major refiners to absorb any further production has left much crude oil on the spot market. If the Richfield had continued to function in a normal manner and continued to purchase the quantity which it previously had been buying, other major companies might have been able to absorb the additional excess. As the situation turned out, however, producers were left without a buyer for production and these operators have found it necessary to sell their crude oil for whatever it would bring in order to meet current expenses.

Easy to Undersell Majors

With the price of crude oil establishing the price at which gasoline could be sold profitably, independent refiners picking up cheap crude were in a position to undersell gasoline produced from higher priced crude purchased on the old schedule. This situation resulted in loss of gallonage by major companies because of their inability to compete with cut rate prices as long as they operated on raw material purchased at higher prices. Although major buyers had published price lists they were not signing up any additional contracts for the purchase of crude oil. This is attributed to the fact that most of the major refiners have been absorbing crude in excess of their refinery requirements in an effort to stabilize conditions.

The disadvantages of attempts to effect stabilization by the accumulation of surplus production reached the point where a continuation of this policy became inadvisable. If there had been any immediate hope of a substantial improvement or appreciable relief from overproduction, this policy might have been continued. As conditions stand, however, all indications point to continued overproduction, notwithstanding attempts to regulate drilling and production activities.

The reduction in crude oil prices posted by the Union Oil Co. does not mean a discontinuance of the present statewide curtailment program because any relaxation would lead to still lower prices. This is particularly true in view of the fact that the State's potential is at least 750,000 bbls. per day, which is more than refinery and marketing requirements.

Town Lot Drilling Campaign Feared

In addition to the State's present potential production, the industry is faced with the possibility of having to cope with another intensive town lot drilling campaign in the Huntington Beach Field of Los Angeles Basin. Commercial production has not yet been developed in the projected deep zone at Huntington Beach but the probable existence of a new deep productive zone in this area is generally recognized. A deep drilling campaign in the town lot area of the Huntington Beach Field at the present time would throw an additional quantity of crude oil on the market and tend to weaken the entire price structure. W. E. McCaslin's No. 17 Transport is expected to reveal the potentiality of this deep zone in the near future as it has only a short distance to go to reach the oil sand found by the Superior Oil Co. in No. 1 fee. The latter well, incidentally, is bottomed at 7,648 feet and has been finished with a 4¾-inch combination string cemented through perforations at 7,473 feet. The Superior is deepening two other wells to the deep zone in this field at the present time. The Wilshire Oil Co. has just been granted permission by the State Mining Bureau to redrill and deepen Nos. 5, 6, 8, 11 and 12 from their present depths to the new Superior zone.

There has been a decided reduction in drilling operations during the last several months and a further tightening of development work is expected unless of course a town lot drilling boom gets under way in the Huntington Beach Field. Practically all this work will be done by independent operators as the Standard is the only major controlling a large number of drilling sites in the congested area. This company, however, will probably find it necessary to increase the present scope of work in order to protect its acreage from drainage.

Slight Increase at Kettleman Hills

A slight increase in drilling is also expected to take place at Kettleman Hills but this will be a negligible factor as it will not require many wells to increase field production to the established maximum. The advisory committee recently increased the allowable daily production of the North Dome from 22,500 bbls. to 25,000 bbls., the increase resulting from completion of No. 2 Felix of the Petroleum Securities.. The daily allowables for Maricopa Flats and Round Mountain were increased 150 bbls. and 1,500 bbls. respectively. Kern Front, Potrero, Rincon, Santa Fe Springs, Long Beach and Playa Del Rey were reduced, the potential and allowable production both being cut.

New rigs erected, the amount of drilling under way and the number of wells completed in California have registered consistent substantial declines since the latter part of last year. The number of new rigs erected for instance, declined from 115 in October, 1930, to 68 in November and continued declining, falling to 43 in December and 28 in January, 1931. The average for the year 1930 was 80, as compared with 109 in 1929 and 107 in 1928. The number of uncompleted drilling wells showed a corresponding reduction, dropping from 437 in October to 419 in November, 370 in December and 325 in January. The average for 1930 was 434, compared with 610 in 1929. Completions also registered a big drop. In October, 1930, there were 82 producing wells finished, as compared with 76 in November, 65 in December and 39 in January. The average number of completions during 1930 was 63, as compared with 76 in 1929 and 59 in 1928.

To Launch Operations April 1

The Kettleman North Dome Association, with a membership of 15, will officially launch its operations on April 1. Under an agreement with Secretary of the Interior Wilbur, the existing plan, which requires suspension of development

TANKER SHIPMENTS FROM LOS ANGELES TO ATLANTIC AND GULF COAST PORTS

Commodity—	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Crude oil	.....	.....	.....	.....	.....	77,405
Fuel oil	.....	.....	.....	.....	.....	71,950
Diesel and gas oil	.....	.....	196,794	28,113	606,269	702,076
Gasoline	265,485	37,926	228,173	32,596	2,470,176	3,153,322
Coastwise—						
Crude oil	402,000	57,429	440,614	62,945	2,731,278	2,796,950
Fuel oil	295,559	42,223	311,650	44,521	2,932,003	2,853,841
Diesel and gas oil	56,593	8,085	16,201	2,314	330,848	346,349
Gasoline	203,062	29,009	315,977	45,140	1,912,690	1,874,629
Kerosene	.....	.....	.....	.....	63,281	17,345
Exports—						
Crude oil	10,001	1,429	66,466	9,495	1,204,556	1,201,706
Fuel oil	375,644	53,663	553,775	79,111	2,666,501	2,736,585
Diesel and gas oil	59,501	8,500	78,700	11,243	576,331	1,052,109
Gasoline	284,720	40,674	76,540	10,934	1,765,533	2,663,205
Kerosene	.....	.....	.....	.....	174,755	436,044
Lubricants	.....	.....	.....	.....	.....	5,057

TANKER SHIPMENTS FROM SAN FRANCISCO TO ATLANTIC AND GULF COAST PORTS

Diesel and gas oil	.....	.....	.....	.....	.....	88,280
Gasoline	.....	.....	.....	.....	63,975	285,245
Lubricants	.....	.....	.....	.....	11,000	.....
Coastwise—						
Fuel oil	90,080	12,869	133,077	19,011	606,996	539,268
Diesel and gas oil	.....	.....	5,213	745	5,213	53,466
Gasoline	42,518	6,074	44,227	6,320	422,288	765,735
Kerosene	.....	.....	.....	.....	16,877	91,774
Exports—						
Crude oil	.....	.....	.....	.....	6,010	3,075
Fuel oil	.....	.....	.....	.....	63,610	122,143
Diesel and gas oil	.....	.....	.....	.....	113,156	124,540
Gasoline	.....	.....	85,117	12,160	318,272	690,185
Kerosene	.....	.....	.....	.....	190,412	133,749

Directors and officers of the Kettleman North Dome Association. Top row, reading from left to right: Emil Kluth, Getty Oil Co.; N. A. Rousselot, Milham Exploration Co.; W. C. McDuffie, Pacific Western Oil Co.; R. A. Sperry, General Petroleum Co.; A. H. Bell, Continental Oil Co. Seated, left to right: Carl Beal, secretary-treasurer; C. P. Watson, Milham Exploration Co.; John A. Brown, president, General Petroleum Co.; L. C. Decius, Associated Oil Co.; Roy E. Collom, Continental Oil Co. J. U. Stair, of Shell Petroleum Corp., a director, and William Reinhardt, general manager, were not present.

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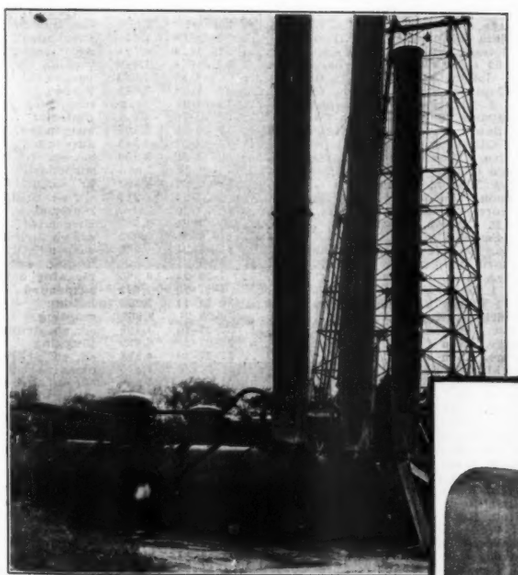

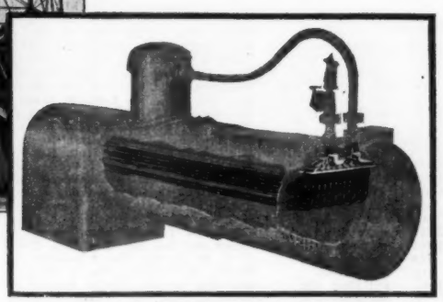

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Kewanee Boiler Corporation, Kewanee, Ill.
Lucey Manufacturing Corp., Chattanooga, Tenn.
Oil Well Supply Co., Oil City, Pa.
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work until July 31, will be canceled as of March 31. The association will have about 3,500 bbls. daily output from two producing wells on government acreage, aggregating 10,800 acres on North Dome controlled by the association. These two wells, No. 1 Elliott of the Continental Oil, and No. 1 Elliott of the Milham Exploration Co., are also making about 130,000,000 feet of gas a day from the upper or Elliott zone. Under the policy of the association, the Elliott zone is to be cased off in future drilling and production will come from the bottom of the Temblor in the Ochsner zone. This will permit the exercise of greater control over the gas oil ratios.

The protection of the association's acreage already has been undertaken with the drilling of two new offset wells and the deepening of two idle wells to lower producing zones. This brings the field total to 21 drilling wells, in addition to two more scheduled to get under way shortly. The association is working out a program of orderly development which is expected to bring the field's output to approximately 50,000 bbls. per day by the close of 1931. The Standard has its 9,000 acres of proven acreage in a separate unit which will co-operate with the association. The Standard unit now has a daily output of approximately 5,000 bbls. of oil and 190,000,000 feet of gas.

Association to Finance Itself

The Kettleman North Dome Association recently decided to finance itself in connection with orderly development of the North Dome of the Kettleman Hills Field, and consequently will not call for a bond issue to provide the necessary money for drilling operations and current expenses. Each oil company whose membership in the association entitles it to a share in the development of the North Dome is expected to be assessed for expenses. Money raised from company members will be used in future development and in paying salaries. Carl Sampson, assistant to William Reinhardt, manager of the Kettleman North Dome Association, has been placed in charge of all information regarding development of the property under control of the association. New offices in the Richfield Oil Co. Building will be occupied by March 15. Several wells are rotating ahead in Temblor oil sand at the present time and, judging by their respective depths, several potention producers should be finished within the next three or four months.

Questions affecting the oil conservation program are involved in The Texas Company's suit for declarative relief against M. M. Alta Vedder and Dwight C. Vedder, which Superior Judge Yankwich has just taken under submission. Attack on the Cartwright act figured in the argument, which consumed a day. The Texas Company holds an agreement from the Vedders permitting drilling on 40 acres in the Mount Poso Field and to have control of operations. After drilling four wells, The Texas Company began in August, 1930, curtailment reducing output to 43 per cent of potential production, which it asserts is necessary and will benefit all parties. The company complains that the Vedders insist its duty is to operate wells at maximum and that they threaten to forfeit the contract for breach. The Vedders deny the company's right to curtail production. They assert that the curtailment program is in violation of the Cartwright act and unconstitutional, and that by curtailing production the company has violated its agreement.

Questions Submitted

Submitted to Judge Yankwich are the questions: (1) Does an operating agreement which gives an oil company full control of operations permit it to curtail production? (2) Is the curtailment in the particular field reasonable? (3) Is the curtailment in violation of the Cartwright act as it stood before its amendment in 1909?

The Vedders contend that under the Cartwright Act as originally enacted any agreement to curtail the production of a commodity was illegal. This provision was amended in 1909 by excluding therefrom combinations to curtail production of goods for which there would be no market or on which no reasonable profit could be obtained otherwise. This clause the Vedders attack as unconstitutional. At the hearing before Judge Yankwich testimony of prominent figures in the oil industry contradicted a widespread belief that the major companies are solely responsible for the conservation program. It was testified that the major companies or so-called independents had eight members on the fact finding committee which inaugurated the policy, while the major companies had only seven members.

Playa Del Rey

Production in the Playa Del Rey Field of Los Angeles Basin has shown a decided decline during the last several weeks, due to curtailment work and a normal decline. Drilling operations in this field have reached a low ebb and this reduction in drilling has resulted in a substantially small number of completions. There were only three wells put on production this week, one of which was a recompletion. This was H. R. Dabney's No. 1 Robertson, which was returned to production pumping 195 bbls. per day after being plugged back from 4,536 feet to 3,980 feet.

The Blueridge Oil Co. finished a fairly good well a few days ago when No. 14 Hertel was brought in flowing 505 bbls. initially from the deep Recreation zone. This new well, bottomed at 5,685 feet, was finished with a 6⅝-inch water string landed at 5,417 feet and a 4¾-inch liner

(Continued on Page 127)

MUSKEGON CRUDE CUT 38 CENTS PER BARREL IN RECENT CHANGE

By Paul A. Elliott

MUSKEGON, Mich., Mar. 7.—Michigan's infant oil industry was dealt a blow with the announcement of a cut in crude oil prices effective Thursday, March 5, in the Muskegon Field.

No announcement had been made up to the close of the week on Pleasant crude, for which the Pure Oil Co. has been paying a flat price of $1.10, slightly above the Mid-Continent price.

Stanolind Oil & Gas Co. announced the new Mid-Continent scale on March 7 which means about 63 cents a barrel for Muskegon crude at a gravity averaging between 38° and 39°. The reduction to Muskegon producers, therefore, was about 38 cents a barrel, or about 38 per cent from $1.01 a barrel.

Independent refiners at Muskegon and Mount Pleasant who have been paying as high as 30 cents above the Mid-Continent scale as a premium are expected to meet the cut in posted price to maintain a similar differential although no definite announcement has been made.

Permits for five new wildcats issued this week indicate that not all new development will be stopped by the present situation.

Of the five new locations two are in Isabella County near the Mount Pleasant Field; one in Muskegon County near the Muskegon Field; one in Clare County near the present Clare gassers, and the fifth in Monroe County where several small oil wells have been struck in recent years in the Trenton limestone, but where no commercial production as yet has been developed.

The Isabella County tests will be as follows: Michigan Oil & Gas Corp.'s No. 1 John Parker, C NW SE, Section 7-16n-3w, Wise Township, and Deerfield-Nottawa Oil Corp.'s No. 1 Charles E. Smith and Anthony Tillman, SW cor. SE NE, Section 35-15n-5w, Nottawa Township.

H. and W. Feicke's No. 1 Feicke, SE SW, Section 1-11n-17w, Fruitland Township, Muskegon County, is the new Muskegon well for which a rig has been erected and drilling started.

Henry M. Brown's No. 2 McKay & Mercier well, C SW SE, Section 1-17n-5w, Surrey Township, Clare County, and H. V. Dougherty assigned to E. L. Dayton No. 2 George Fasking, SE NE, Sec-

(Continued on Page 127)

IMPORTANT NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S-T-R	Depth	Status
Western Gulf, No. 1 Santa Maria, Santa Barbara Co.	5- 9-33	5,700	br. sh. drilling
Fields Gas Co., No. 1 Santa Maria, Santa Barbara Co.	8- 9-33	5,570	suspended
Barnsdall, No. 1 Gato Ridge, Santa Barbara Co.	9- 8-32	6,050	fishing
Midwest Oil Co., No. 1 Los Alamos, Santa Barbara Co.	2- 7-33	1,800	suspended
General Pet., No. 1 Goleta, Santa Barbara Co.	21- 4-28	4,533	gas—shut in
General Pet., No. 2 Goleta, Santa Barbara Co.	21- 4-28	4,350	gas—shut in
General Pet., No. 3 Goleta, Santa Barbara Co.	21- 4-28	4,540	redrilling
General Pet., No. 134 Goleta, Santa Barbara Co.	21- 4-28	1,485	suspended
General Pet., No. 136 Goleta, Santa Barbara Co.	21- 4-28	1,411	br. sh. drilling
General Pet., No. 137 Goleta, Santa Barbara Co.	21- 4-28	2,050	suspended
General Pet., No. 138 Goleta, Santa Barbara Co.	21- 4-28	4,931	suspended
General Pet., No. 139 Goleta, Santa Barbara Co.	21- 4-28	2,051	suspended
General Pet., No. 143 Goleta, Santa Barbara Co.	21- 4-28	1,040	suspended
Boles Oil Co., No. 140 Goleta, Santa Barbara Co.	22- 4-28	1,040	suspended
U. S. Pet., No. 141 Goleta, Santa Barbara Co.	20- 4-28	1,035	suspended
U. S. Pet., No. 142 Goleta, Santa Barbara Co.	20- 4-28	1,032	suspended
U. S. Pet., No. 143 Goleta, Santa Barbara Co.	20- 4-28	1,019	suspended
El Camino, No 149 Goleta Tideland, Santa Barbara Co.	22- 4-28	1,035	suspended
Bolsa Chica, No. 191 Goleta, Santa Barbara Co.	24- 4-29	4,191	recemented
Caldwell Brown, No. 159 Goleta, Santa Barbara Co.	24- 4-29	1,040	rigging up
Johnson, George, No. 1 Goleta, Santa Barbara Co.	X- 4-28	4,089	suspended
Prairie Oil Co., No. 1 Capitan, Santa Barbara Co.	32- 5-30	3,650	Sespe
Cuyama Oil Corp., No. 1 Cuyama, Santa Barbara Co.	12-10-27	rig	suspended
Hart Pet. Co., No. 1 Cuyama, Santa Barbara Co.	27-10-26	....	material
Wildcat Oil Co., No. 1 Santa Maria, Santa Barbara Co.	20-10-35	5,500	suspended
Pacific Western, No. 1 Gibraltar, Santa Barbara Co.	14- 5-27	2,345	suspended
Prairie Oil & Gas Co., No. 1 Ventura, Ventura Co.	30- 3-22	8,800	sd. sh. drilling
Associated, No. 1 Rincon Creek, Ventura Co.	19- 4-24	2,080	suspended
C. C. M. O. Co., No. 2-A Rincon, Ventura Co.	23- 3-24	8,493	br. sh. drilling
Continental, No. 1 Rincon, Ventura Co.	23- 3-24	917	sd. sh. drilling
Associated, No. 1 Fillmore, Ventura Co.	16- 4-20	....	material
Pure Oil Co., No. 1 S. P. Canyon, Ventura Co.	15- 4-21	2,591	suspended
Superior Oil Co., No. 1 Sespe, Ventura Co.	14- 4-21	5,600	sd. sh. drilling
Lockwood Valley Oil Co., Well No. 1, Ventura Co.	32- 8-21	1,015	suspended
Magu Synd., No. 1 Oxnard, Ventura Co.	17- 1-21	rig	rigging up
Wilshire Oil Co., No. 1-A Buttonwillow, Kern Co.	7-29-24	6,590	cleaning out
Kent & McDonald, No. 1 Temblor Hills, Kern Co.	3-32-22	1,672	suspended
Federal Drlg. Co., No. 1 Buena Vista, Kern Co.	20-31-24	5,270	bailing
General Pet., No. 1 Beiridge, Kern Co.	30-28-21	3,605	reaming
The Texas Company, No. 1 Beiridge, Kern Co.	22-27-20	4,700	sd. sh. drilling
Richfield, No. 1 Beiridge, Kern Co.	20-27-20	6,639	plugging
Standard, No. 2 Beiridge, Kern Co.	31-27-20	4,811	sd. sh. drilling
Ohio Oil Co., No. 1 Beiridge, Kern Co.	36-27-20	5,815	cleaning out
Reward Oil Co., No. 1 Beiridge, Kern Co.	34-27-20	3,990	sd. sh. drilling
Union, No. 17 Beiridge, Kern Co.	36-27-20	5,230	oil sand
Continental, No. 1 Beiridge, Kern Co.	36-27-20	rig	rigging up
Casa Mira Oil Co., No. 1 Beiridge, Kern Co.	29-28-20	rig	suspended
Tom Cannon, No. 1 Beiridge, Kern Co.	18-28-22	rig	suspended
Wallace, K. C., No. 1 Beiridge, Kern Co.	32-29-21	4,200	sd. sh. drilling
Rio Cal. Pet., No. 1 Rhale, Kern Co.	2-27-18	2,355	suspended
Wicker, Sy, No. 1 Arvin, Kern Co.	13-30-28	1,250	suspended
Shell, No. 1 Weed Patch, Kern Co.	29-30-29	7,575	hd. sd. drilling
Shell, No. 2 Weed Patch, Kern Co.	29-30-29	5,714	sd. sh. drilling
Shell, No. 3 Weed Patch, Kern Co.	32-30-29	3,690	sd. sh. drilling
Mohawk Oil Co., No. 1 Weed Patch, Kern Co.	32-30-29	5,966	fishing
Mohawk Oil Co., No. 2 Weed Patch, Kern Co.	4-31-29	rig	rigging up
Alpine Oil Co., No. 1 Weed Patch, Kern Co.	13-31-29	rig	rigging up
Standard, No. 1 Devils Den, Kern Co.	14-25-18	2,175	br. sh. drilling
Hannon, Tom, No. 1 Devils Den, Kings Co.	25-25-18	2,650	reaming
Shell, No. 1 Semitropic, Kern Co.	17-27-23	9,700	cleaning out
Cities Service, No. 2 Wasco, Kern Co.	16-28-24	690	core hole
C. C. M. O. Co., No. 1 Jasmine, Kern Co.	31-28-25	1,850	hd. sd. drilling
Moran & DeCamp, No. 1 Mojave, Kern Co.	26-10-14	750	suspended
Meridan Oil Co., No. 1 Antelope, Kern Co.	11- 9-15	3,804	suspended
Ritchie, J. J., No. 1 Tejon, Kern Co.	33-11-19	5,530	suspended
Associated, No. 1 Jacalitos, Fresno Co.	22-21-15	4,025	gr. sd. drilling
Carruthers Oil Co., No. 1 Fresno, Fresno Co.	4-17-20	rig	suspended
Miracle Oil Co., No. 1 Cuyama, San Luis Obispo Co.	17-10-25	314	suspended
Panorama Oil Co., Well No. 1, San Luis Obispo Co.	7-31-21	4,019	suspended
Latin Amer. Pet., No. 1 Shandon, San Luis Obispo Co.	21-27-15	4,525	suspended
Continental, No. 1 San Miguel, San Luis Obispo Co.	26-25-11	4,675	hd. sd. drilling
Schilling, C., No. 1 Atascadero, San Luis Obispo Co.	24-28-12	916	suspended
Martin, J. D., No. 1 Edna, San Luis Obispo Co.	5-31-13	3,010	suspended
Schockley, C., No. 1 Pismo, San Luis Obispo Co.	13-32-13	2,530	suspended
Pacific Inland, Well No. 1, Monterey Co.	19-23-15	1,075	hd. sd. drilling
Brown, F. A., No. 1 Parkfield, Monterey Co.	15-23-14	816	suspended
O'Donnell, J. E., No. 1 Dudley Ridge, Kings Co.	7-23-20	1,635	gas well—idle
Murphy Oil Co., No. 1 Dudley Ridge, Kings Co.	20-23-20	3,750	sd. sh. drilling
Kettleman Lakeview, No. 1 Tulare Lake, Kings Co.	11-23-18	1,304	cleaning out
Purman, T. H., No. 1 Reef Ridge, Kings Co.	36-23-17	2,574	cleaning out
Seymour, L. W., No. 1 Avenal, Kings Co.	10-23-16	1,148	suspended
Twin State Oil Co., No. 1 Point Arena, Mendocino Co.	14-12-17	6,150	sd. sh. drilling
Orinda Pet., Well No. 1, Contra Costa Co.	32- 1- 3	1,405	hd. sd. drilling
Pettingail, C. F., No. 1 Porterville, Tulare Co.	15-22-27	rig	suspended
Inland Valley Oil Co., No. 1 Visalia, Tulare Co.	24-17-24	2,192	cleaning out
Colusa Oil Co., No. 1 Bush, Colusa Co.	31-15- 4	840	hd. sd. drilling
Oakdale Oil Co., No. 1 Oakdale, Stanislaus Co.	3- 2-10	4,100	hd. sd. drilling
Orland Oil Synd., No. 1 Orland, Tehama Co.	31-23- 3	2,355	sd. sh. drilling

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S-T-R	Depth	Status
Olympic Realty Corp., No. 1 Barnes, Los Angeles Co.	14- 2-15	4,875	cleaning out
Hines Pet., No. 1 Ocean Park, Los Angeles Co.	9- 2-15	1,290	cleaning out
Taylor Oil Co., No. 1 Culver, Los Angeles Co.	12- 2-15	6,050	sd. sh. drilling
Mesmer City Corp., No. 1 Mesmer, Los Angeles Co.	24- 2-15	1,010	sd. sh. drilling
Dwyer & Becker, No. 1 Compton, Los Angeles Co.	17- 3-13	4,520	suspended
Allison Synd., No. 1 Baldwin, Los Angeles Co.	8- 2-14	5,110	testing
Cal. Ventura Oil Co., No. 1 Manhattan, Los Angeles Co.	30- 3-14	6,525	suspended
Cal. Ventura Oil Co., No. 1 Hermosa, Los Angeles Co.	31- 3-14	3,396	suspended
Cal. Ventura Oil Co., No. 2 Hermosa, Los Angeles Co.	31- 3-14	3,300	suspended
Cal. Oilfields Corp., No. 1 Hermosa, Los Angeles Co.	31- 3-14	1,316	cleaning out
Corniel Oil Corp., No. 1 Hermosa, Los Angeles Co.	31- 3-14	3,070	sd. sh. drilling
Westwood Pet., No. 1 Hermosa, Los Angeles Co.	6- 4-14	rig	suspended
Tulsa Oil Co., No. 1 Hermosa, Los Angeles Co.	6- 4-14	rig	suspended
Wood, C. L., No. 1 Hawthorne, Los Angeles Co.	10- 3-14	2,184	suspended
McMahon & McDonald, No. 1 Watts, Los Angeles Co.	12- 3-14	4,665	suspended
Staple Oil Co., No. 1 Manhattan, Los Angeles Co.	24- 3-15	780	suspended
Shelley, C. M., No. 1 Torrance, Los Angeles Co.	12- 4-14	rig	suspended
Olympic Oil Co., No. 1 Watson, Los Angeles Co.	29- 4-13	mtl.	building rig
Mack Oil Co., No. 1 Chatsworth, Los Angeles Co.	6- 2-16	rig	suspended
San-Van Oil Co., No. 1 Van Nuys, Los Angeles Co.	14- 1-16	2,124	recemented
Rucker & Croul, No. 2 Puente, Los Angeles Co.	27- 2-10	1,873	sd. sh. drilling
Arden Oil Co., No. 1 Puente, Los Angeles Co.	15- 2-10	3,235	suspended
D. & B. Oil Co., No. 1 Puente, Los Angeles Co.	3- 2-10	4,620	suspended
El Dorado Oil Co., No. 1 Puente, Los Angeles Co.	30- 2- 9	1,092	suspended
Marcel Pet. Co., No. 1 Puente, Los Angeles Co.	31- 2- 8	3,100	suspended
Cudahy Oil Co., No. 1 Bell, Los Angeles Co.	30- 2-12	1,030	cleaning out
The Texas Company, No. 1 Montebello, Los Angeles Co.	4- 2-12	2,221	sd. sh. drilling
Celito Oil Co., No. 1 Monterey Park, Los Angeles Co.	28- 1-12	5,278	suspended
Hammer, Fred, No. 1 Alhambra, Los Angeles Co.	24- 1-13	3,412	suspended
Los Gatos Oil Co., No. 1 El Monte, Los Angeles Co.	16- 1-11	2,280	suspended
Rancho Oil Co., No. 1 Rosemead, Los Angeles Co.	30- 1-11	4,040	sd. sh. drilling
Olympic Corp., No. 1 Calabasas, Los Angeles Co.	18- 1-17	5,695	prod. test
Nesa Pet., No. 1 Newport, Orange Co.	21- 6-10	4,910	suspended
Hall, H. L., No. 1 Newport, Orange Co.	20- 6-10	790	suspended
Gesell, T. F., No. 1 Newport, Orange Co.	29- 6-10	1,102	sd. sh. drilling
Standard, No. 1 Newport, Orange Co.	26- 6-10	3,775	hd. sd. drilling
Borderland Oil Co., No. 1 Encinitas, San Diego Co.	12-13- 4	2,519	suspended
Borderland Oil Co., No. 1 Point Loma, San Diego Co.	30-16- 3	4,175	suspended
Carr, O. K., No. 1 Capistrano, San Diego Co.	13- 8- 8	5,350	cleaning out
Grey, H. H., No. 1 Redlands, San Bernardino Co.	25- 1- 2	2,392	suspended
Western Gulf, No. 1 Santa Ana, Orange Co.	12- 3- 8	2,366	cleaning out
The Texas Company, No. 1 Olive, Orange Co.	7- 4- 9	3,230	sd. sh. drilling

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The Mechanical Brain is invaluable on digging like this. It lets go when the strain is too great, but keeps jerking at the rocks that are in the way.

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EENE

Aurora, Illinois

Hardin County, Ohio, Well Over 250 Bbls.

Kemrow Co.'s Properties in Central Ohio and Lima Fields Purchased by Appalachian Corporation. Will Continue Operations

By George A. Whitney
Staff Correspondent, Central West Fields

FINDLAY, Ohio, Mar. 9.—Another large operating concern has entered the Central Ohio and Lima divisions of the Central West Field, by the purchase by the Appalachian Gas Corp. of the large holdings of the Kemrow Co., consisting of 73,500 acres of leases, on which there are 68 oil-producing wells and 165 gas wells, including producing properties in Ashland, Holmes, Wayne, Medina and Guernsey Counties, in Central Ohio; Noble and Morgan Counties in southeastern Ohio Field, also in Hardin and adjoining counties in the eastern portion of the old Lima Field of northwestern Ohio. The reported price has been announced at approximately $1,500,000. The Kemrow Co.'s headquarters are at Wooster; John J. Klise is president. It has been operating in the fields mentioned for close to 20 years. The Appalachian corporation's subsidiaries include the West Virginia Gas Corp. and the Ohio Southern Gas Co. The Kemrow Co., according to advices, will continue operations in the Pennsylvania, Texas and Kentucky fields, where it holds large leased acreage.

The Appalachian Gas Corp.'s first well to be brought in after the purchase of the Kemrow Co.'s holdings is a big surprise to all familiar with the Hardin County Field, in the old Lima Trenton Rock area. The new well is No. 1 on the A. W. Kreitzler farm, Section 12, Cessna Township, an initial producer good for better than 250 bbls., at a depth of 1,407 feet, the largest well found in the old Lima Field for many months. In Tymochtee Township, Wyandot County, Jones and Coyle have a light gas well in No. 2 on the Mary Chaney farm, from 1,350-1,575 feet, and are drilling No. 1 Byron E. Powell farm, both in Section 8.

A. A. Lauber in putting down a test on the J. W. Long farm, Section 33, Butler Township, Mercer County, in the Lima Field, struck a nice volume of gas at a depth of 675 feet and shut down, and may use the gas for fuel purposes. In Union Township, same county, the Ohio Oil Co. abandoned Nos. 1, 2 and 5 J. W. Dutton farm, Section 9, also Nos. 2, 4, 5, 6, 7, 8, 9, 10 and 11 James Clover farm, same section.

CENTRAL OHIO

Eighteen completions were reported from the Central Ohio Field, with 4 producers with an initial production of 120 bbls., 6 dry holes and 8 gas wells. In work starting there were 12 locations made and 6 started spudding, a total of 18.

One of the interesting developments of the week was the finding of a small gas well by unknown parties on the Kisco Valley farm, in Madison Township, Pickaway County. There was only a small volume of 7,000 feet, the gas being found from 72½-73½ feet, and drilled to a total depth of 95 feet. The formation in which the gas was found is known as the shale and is similar to that in wells found in many places in northwestern Ohio and southern Michigan. In Michigan the gas usually stands up for many years as some of the wells show a rock pressure of around 40 pounds. A well visited in Michigan, a shallow test, showed a rock pressure of but 16 pounds and has been used continually the entire winter in heating a large hot house and was completed more than a year ago. Pickaway County, Ohio, is directly south of Franklin County and between Columbus and Chillicothe.

In Ashland County, Perry Township, the Ohio Fuel Gas Co.'s No. 1-5,343 Felix J. Pauly farm, Section 6, failed to find any sand, and is a dry hole. The Kemrow Co. made a location on the Kent Welsh farm, Section 7, Orange Township, same county.

Medina County

In Medina County, Homer Township, the Kemrow Co. found a fair gas well on the Frank Rhader farm, Section 4, in the Clinton lime from 2,948-58 feet. In Chatham Township, the Preston Oil Co.'s No. 18-1,471 on the C. and E. Clapp farm, Lot 5, which produced an initial of 40 bbls. from 412-48 feet. Mack P. Colt and others' No. 14 J. and A. Jelensics farm, Lot 2, same township, produced an initial of 20 bbls. from 290-334 feet. The Edson Sons Co.'s No. 14 Marcus A. Frank farm, Lot 20, same township, had an initial of 50 bbls. from 416-471 feet, while its No. 14 George W. Packard farm, Lot 4, was a dry hole from 316-417 feet.

In Wayne County, Congress Township, a dry hole was drilled by Barnhart and others on the Edwin J. Garvin farm, Section 27, from 3,132-35 feet. Ditch and others are drilling No. 3 Joseph B. Sherrick farm, Section 1, Chester Township. Hulse & Kundtz, well-known Cleveland operators, are drilling on the Myers & Horn farm, Section 1, Plain Township.

In Richland County, Worthington Township, the Ohio Fuel Gas Co. has a dry hole in No. 1-5,369 J. E. and Maud Dunn farm, Section 36. Harmon & George are starting a test on the Isaac Bay and others' farm, Section 22, Miflin Township.

In Knox County, the Upham Gas Co. is drilling a second test on the J. B. White farm, Section 23, Union Township.

In Coshocton County, Perry Township, the Preston Oil Co. has a gas well in No. 1-1,463 George M. Oxley farm, Section 25, from 2,055-3,070 feet.

In Summitt County, Coventry Township, Kime and others have a dry hole on the Thomas Vaughn farm, Section 2. Red sand was found from 3,834-81 feet, and Clinton lime from 3,887-3,915 feet. East Ohio Gas Co. is starting a test on the C. C. McCue farm, Section 19, Greene Township.

In Muskingum County, W. H. Atha brought in a nice gas well on his own farm in Falls Township, which is No. 3 well, the gas being found from 3,558-74 feet. Wittmer Properties, trustee, has a fishing job at 3,930 feet in No. 1 Carl W. Riley farm, Section 11, Perry Township, and the same parties are shut down at a depth of 4,058 feet in No. 2 Thomas J. Chaplin farm, in the fourth-quarter of Washington Township, same county.

In Athens County, Ames Township, the Ohio Fuel Gas Co.'s No. 4-5,467 on the N. A. Cleater farm, Section 4, is a light gas well at 1,571 feet. Standard Natural Gas Co. is drilling No. 1 William Roach farm, Section 7, York Township.

Stark County

In Stark County, Penn Oil & Gas Co. has a gas well in No. 2 on the Mary A. Killinger farm, Section 6, Jackson Township. Red sand was found from 4,120-52 feet and the Clinton from 4,152-73 feet. Medford Oil & Gas Co. made a location for No. 2 on the John Firestone farm, Section 35, same township, and the Stoltz Oil & Gas Co. is starting No. 1 James Halter farm, same section.

In Fairfield County, Walnut Township, the Gas Producing Co.'s No. 1 Otis O. Holliday farm, Section 14, is credited with an initial production of 10 bbls. from the lime formation 1,966-77 feet. The City Natural Gas Works' No. 1 on the Luthern Parsonage, Section 12, Berne Township, is a gas well at a total depth of 2,554 feet.

In Guernsey County, Wheeling Township, a dry hole was drilled by the Ohio Fuel Gas Co. in No. 1-5,364 E. E. Alexander farm, Section 9, at 3,597 feet.

In Belmont County, Somerset Township, John Kirk and others have a light gas well on the C. W. Henderson farm, Section 22, at a depth of 1,961 feet.

In Medina County, Chatham Township, C. L. Williams and others' second test on the C. G. Chapman farm, Lot 1, is hardly good for a barrel a day from a depth of 436 feet.

INDIANA

An exceptionally fine gas well was uncovered by Charles C. Talliaferro, Jr., in a second test in the northwest corner of the Matilda Balderback farm, SE Section 23, Washington Township, Pike County. Sand was tapped at 1,038 feet and at 3 feet in to a total depth of 1,041 feet, the well showed a volume of 1,000,000 feet. In the same township, G. H. Risher found a dry hole in the southeast corner of the Barney Fair farm, SE Section 24. In Madison Township, same county, the Ohio Oil Co. pulled out and abandoned No. 11 on the W. H. Gladish farm, NW Section 6.

Knox County has two new wells drilling by the James H. Gardner Petroleum Co. in No. 1, 660 feet from the south and west corner of the J. P. Beard farm, SW Section 10, Busseron Township, and the other being 660 feet from the southeast corner of the Ruth Winemiller farm, NW Section 14, same township. Wells and Joyes are drilling on the J. P. and R. A. Beard farm, NW Section 22, same township, and the Shell Petroleum Co. is drilling No. 2 in Survey No. 11, same field.

ILLINOIS

Only one completion was reported from the Illinois fields, W. C. McBride, Inc.'s test, 200 feet from the north line and 1,100 feet from the west line of the William Dickinson farm, NE Section 10, Montgomery Township, Crawford County, and was dry at a depth of 1,110 feet.

The Ohio Oil Co. abandoned No. 2 H. C. Johnson farm, NE Section 25, Petty Township, Lawrence County, also pulled out No. 22 A. R. Applegate farm, Section 12, same township, being old-time producing wells that are showing water.

In the western part of Illinois south of East St. Louis, in the Sugar Loaf Township, of St. Clair County, George P. Hironimus and others abandoned their No. 1 W. H. Melton property, SE Section 21, also pulled out No. 1 J. F. Otis farm, SE, same section.

LEGRANDE POOL EXTENDED MILE BY WELL REPORTED AT 150 BBLS.

By George A. Whitney

OWENSBORO, Ky., Mar. 9.—Little is being done in the Tri-County Field of western Kentucky at this time, as many of the drilling outfits were moved from Ohio, Daviess and other adjoining counties, when the rush started in the Legrande Field of Hart County, so many of the wells that were under way in the Tri-County area are still unfinished, but will be as soon as the shut down movement ends.

One of the gathering lines in the Legrande Field of Hart County has been completed, the Producers Pipe Line Co., which has started loading cars on a spur track of the Louisville & Nashville Railroad at Horse Cave, where the oil is pumped direct from the field proper to the company's storage facilities at Horse Cave. Four tanks of 10,000 bbls. each are under construction, which will permit the shipping of 26 tank cars daily to the Louisville refinery, from 4 and 6-inch lines, and gives the field an outlet for some portion of the production now in tanks on various leases in the field. This line and storage was rushed, as the work started during January.

To the north end of the Legrande Pool, about a mile in advance of the producing area, Dr. S. J. Sirman's test on the William Hensley farm, is reported good for 150 bbls., extending the pool that distance to the north adding many more locations that look favorable between the wildcat well and the pool proper. Pearson Petroleum Co. reports a gas well good for 500,000 feet on the J. L. Roberts farm to the east of Munfordville and northwest of the Legrande Pool proper. Same company is drilling another test in the vicinity on the John Rowntree farm, 2½ miles east of Munfordville. Same company is drilling on the J. A. Edwards farm, near Three Springs; another on the C. Sandidge farm, near the hamlet of Pascal, is drilling on the Bales farm, in the same vicinity. In the Roberts well of the company a gas pay was found at from 335-40 feet and another from 555-726 feet.

The Barren County Oil & Gas Co.'s test just across the Hart County line and in Green County, near the hamlet of Hudgins and a few miles north from the Green River, is reported to be showing for a 35-bbl. producer at a total depth of 548 feet, and shows a nice gas volume. This well is approximately a mile south of the Treamors well on the Akin farm, that showed around 15 to 20 bbls.

Scattered Wells

In Ohio County, Jenkins and others' test on the John Bellamy farm, in the Friendship Pool, is a vervy light gas producer. H. C. Smith Co.'s No. 1 Frank White farm, near Fordsville, same county, is a duster, and the Kentucky Natural Gas Co.'s No. 6 on the J. T. Griffith 225-ac. farm, in the Reynolds Pool, same county, was dry at 500 feet.

In the Legrande Pool, Hart County, C. E. Daugherty and others' No. 1 Mrs. Hand farm, is reported with an initial of close around 350 bbls. Tichenour & Mann's test on the Galt Terry farm, one-half mile northeast of Wabash and 2 miles west of Hammonsville, is reported dry. Top of sand in this well is at 794 feet and no showing at 26 feet in sand at a total depth of 820 feet.

Pearson Petroleum Co.'s No. 2 R. T. Parker farm, in the Niagara Field of Henderson County, rated at 10 bbls. Imperial Oil & Gas Products Co. is drilling No. 1 T. J. Berry farm in the Niagara Field.

In Webster County, Iley J. Browning of Ashland, Ky., struck a 500,000-foot gas well on the Barney Melton farm, 2 miles southwest of the town of Sebree. Wittmer Oil & Gas Co.'s No. 3 Fred Powell farm, same county, is reported a fair gas well.

In McLean County, Mel Root and others' No. 2 on the Central State Bank land, is reported good for 10 bbls., from a depth of 1,700 feet. Locations for Nos. 3 and 4 have been made on the same tract of land. Pampas Oil & Gas Co.'s No. 1 Olive Shockley farm, same county, is a 10-bbl. initial pumper. Johnson Oil & Refining Co. is starting a second well on the William C. Howard farm. The Ohio Oil Co. is drilling No. 4 on the G.

(Continued on Page 156)

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Ashcroft American Gauges	A-5	American Tachometers	J-5	Hancock Forged Steel Valves	W-5
American Temperature Controllers	R-5	Ashcroft Power Control Valves	M-5		

Snapshots by Oil and Gas Journal's Photographers

1—Frank L. Johnson, assistant general salesmanager, Pressed Steel Car Company, Chicago. 2—E. C. Troutman, Hazard Wire Rope Company, Tulsa. 3—Paul L. Brooks, district manager, Parkersburg Rig & Reel Company, Fort Worth, Texas. 4—Waldo Sheldon, J. E. Burden, S. M. Decker, Allen Berry and Earl Evans, Sheldon-Burden Equipment Company and Sheldon Machinery Corporation. 5—D. O. Bayless, landman, The Texas Company, Houston, Tex. 6—Left to right: E. F. Kelley, R. C. Beardon, W. R. Burris, R. J. Wertzberger and G. L. Bovee, representatives of Wertzberger Derrick Company. 7—Bert Weekly, president, Weekly Oil Corporation, and L. P. Sproles, Fort Worth, Tex. 8—C. M. Williams, Tulsa; D. A. Beatty and R. S. Lemons, Parkersburg Rig & Reel Company, Parkersburg, W. Va. 9—R. B. Protzman, Van Nelson, L. M. Deutsch and Marshall Moore, representatives, Byron Jackson Company.

Test South of Joiner Field Looks Dry

Harrison County Also Has a Failure. Well North of Bateman Discovery Makes Couple of Heads After Disappointing Start

By L. E. Bredberg
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Mar. 9.—At last it looks as if at least one test in the Rusk County "play" can be marked off the drilling slate as a dry hole, dispensing with more theories, or proving others, as the case may be. Capps and Smith's No. 1 J. L. Cochran, in the Jacob Roth Survey, several miles south of the Joiner Field, got a big play about 10 days ago when it was logging the formations in a seemingly encouraging manner, but this week it drilled into a formation which many named as the Georgetown lime. This formation was topped at 3,761 feet, approximately 150 feet lower than the Arkansas Fuel Oil Co.'s test on the Worrell farm, 1 mile east of the Joiner Field, which test was dry. Encountering the Georgetown, and at such a depth, apparently puts the test out of the running, and a test made today bears out this belief, for 1,500 feet of rotary mud was all that was found in the hole. No oil or water showed on the test. Total depth of the hole is 3,774 feet. Another test will be made, due to an incomplete test the first time. However, it is generally believed the hole will not show any better on a second test.

Harrison County Test

Sam Hunter's No. 2 Daugherty, in the W. D. Burris Survey, approximately 6 miles northwest of Marshall in Harrison County, marks another area as dry on the eastern rim of the East Texas salt basin. It fails, however, to stop the big play which this county has been receiving, and checkerboarding and blocking of acreage has continued to be brisk throughout the northern, especially the northwestern, part of the county, and many tests will be drilled on the blocks which have been taken since the Farrell-Lathrop discovery in Gregg County brought interest to this neighboring county on the east.

Kilgore Field

Burton Drilling Co.'s No. 1 Florey, in the Peter Holmes Survey, approximately 1½ miles northwest of the Bateman discovery well in the Kilgore area, northern Rusk County, appeared as a dry hole up to this week, but during the forepart of the week it cored saturated sand, made a couple of heads through the drill stem, and proved itself as a potential producer although encountering the sand 145 feet lower than the Bateman discovery well. It is now shut down with casing cemented. Total depth is 3,729 feet, and the sand was supposed to have been cored from 3,710-29 feet. This marks the first western extension to this area but does not lend much encouragement to those who hold acreage farther to the west or northwest. From all appearances, and from wells already drilled in, extending the field, it appears that it will run to the north or northeast and south; how far, no one knows, or will know until some of the tests now drilling in those directions either prove dry or productive.

Brandon and McCamey's No. 1 Richards, in the Mary Van Winkler Survey, 1 mile northeast of Kilgore, is one of the tests which is being closely watched for it will mean a 3½-mile extension to production in the Kilgore Field if it proves productive. It has been shut down for some time at a total depth of 3,475 feet, but was due to start today. Formations in this test have been checking in the right direction for a producer. It topped the Pecan Gap chalk at 2,540 feet, went out of it at 3,927 feet and topped the Austin chalk at 3,428 feet with an elevation of 339 feet. The Bateman discovery topped this last chalk at 3,480 feet with an elevation of 403 feet.

D. H. Byrd and Gulf Production Co.'s No. 1 Elder, in the J. W. McCurry Survey, 1½ miles northeast of No. 1 Richards, is another interesting test as a few hours will tell the story. It is now coring, and showed streaks of sand with oil saturation from 3,552-53 feet, lending chances of success for making a producer and extending the Kilgore Field to the northeast. This test is on a block in which the latter company has a large interest, and the Gulf Pipe Line Co. has already surveyed to a point on the block from its 8-inch trunk line which runs from Oklahoma to the Gulf Coast, a short distance west of Kilgore. If the test proves a producer this company will probably start immediate construction on a lateral line to serve the well and others which will be drilled later on the block.

Gregg County Test

Another test which will be closely watched until its completion, is Lloyd Oil Corp.'s No. 1 Andrews (Elliott), in the W. F. Hyde Survey, approximately 5 miles due north of the Bateman discovery, in Gregg County. Base of the Pecan Gap was marked at 2,990 feet, only a short distance below the base of the Pecan in the Bateman well which was logged at 3,014 feet. The Pecan Gap chalk is the chief marker in the tests in this part of the basin, but it cannot be followed as a certain establishing factor in regard to whether the tests will encounter the Woodbine, and prove successful or failures.

If the Lloyd test on the Andrews (Elliott) farm proves a producer, the sand lens theory of this sector would be rudely disrupted for it would make the Farrell-Lathrop and Bateman areas looks almost positive of being linked together by production since Foster and East Texas Refining Co.'s No. 1 Fisher came in last week extending the former field 3 miles to the south and toward the Bateman Field.

Tidal Oil Co.'s No. 1 Holland in the Juan Ximines Survey was completed this week for 107 bbls. per hour at a total depth of 3,686 feet. This well was the cause of considerable conjecture last week when it first appeared and would not flow, but swabbing finally brought it around to a good well, and whenever it is now opened it shows as having plenty of sand and pressure to maintain its initial success. Production, however, seems to be coming from two separate sands, which would seem to bear out the lens theory, these sands having been logged at 3,657-63 and from 3,666-73 feet.

Production was extended 1,500 feet to the west in the northwestern part of the field this week when the Pilot Oil Co.'s (Cranfill & Reynolds) No. 1 Finney came in for an initial flow of 156 bbls. per hour at a total depth of 3,660 feet. Top of the sand was logged at 3,610 feet.

Farrell-Lathrop Area

Mamie Hammond and others' No. 1 Hamby in the Martin Lant Survey, 4 miles northeast of the Farrell-Lathrop discovery well, was shut down today for repairs. Total depth of the hole is 3,563 feet. It has not encountered any Austin chalk and is the cause of much speculation. It will afford considerable more geological data to this part of the eastern rim of the basin, although the logs and cores are not in the best of shape for subsurface work.

Four tests around the Farrell-Lathrop discovery well are shut down on top of the sand, one of them, the Arkansas Fuel, Farrell and others' No. 1 McKinley, 5,000 feet north of the discovery, cored a richly saturated sand and will extend this field almost another mile to the north, making the field at least 4 miles long from north to south. The other tests on top of the sand are south and southeast offsets. No. 1 McKinley cored the first sand from 3,579-87 feet, striking a hard formation at the latter depth and then going into sand again. Total depth is 3,600 feet.

Joiner Field

Several leases have been sold in the western extension of the Joiner Field during the past two weeks, one being the Deep Rock Oil Co. and others' 40-acre tract on the western side of the Daisy Bradford farm in the Ximines Survey. The Meridian Oil Co. of Tulsa wes reported to have paid $80,000 for this tract, $30,000 cash and the remainder out of oil produced on the lease. One rig is up on the west side of the tract, offsetting Ball and Malone's producer.

The Houston Oil Co. also purchased a 16-acre lease from the Tidal Oil Co. in the Kilgore area. This lease lies in the Robert Winn and H. Hobson Surveys, south of acreage purchased by the Hum-

(Continued on Page 149)

EAST CENTRAL TEXAS WILDCATS

Week Ending March 9

CHEROKEE COUNTY

McDonald Bros.' No. 1 Newton, center of 113-ac. tract, Thomas Quevedo Sur., 3 miles N of Jacksonville .... Derrick.
R. G. Baker et al's No. 1 M. M. Tommie, 945 ft. N and 1,300 ft. E, William George Sur. .... Shut down 4,003 ft.

DELTA COUNTY

Delta Development Co.'s No. 2 Hays Kinney, 300 ft. S of No. 1 Cooper, Townsite Sur .... Shut down 1,905 ft.
D. S. Hoods' No. 1 J. J. Balser, 185 ft. from S and 580 ft. W of Balser 40-ac. tract in SE cor. T. B. Laddin Sur. .... Shut down 1,559 ft.
Everett Drlg. Co.'s No. 1 Sansivy, 1,320 ft. N and 1,320 ft. W, J. B. Craig Sur. .... Shut down 2,984 ft.
Worthington and Stedman's No. 1 W. H. Dojehett, 150 ft. from S and 776 ft. from W of 52-ac. tract, E. Chick Sur. .... Shut down 1,927 ft.

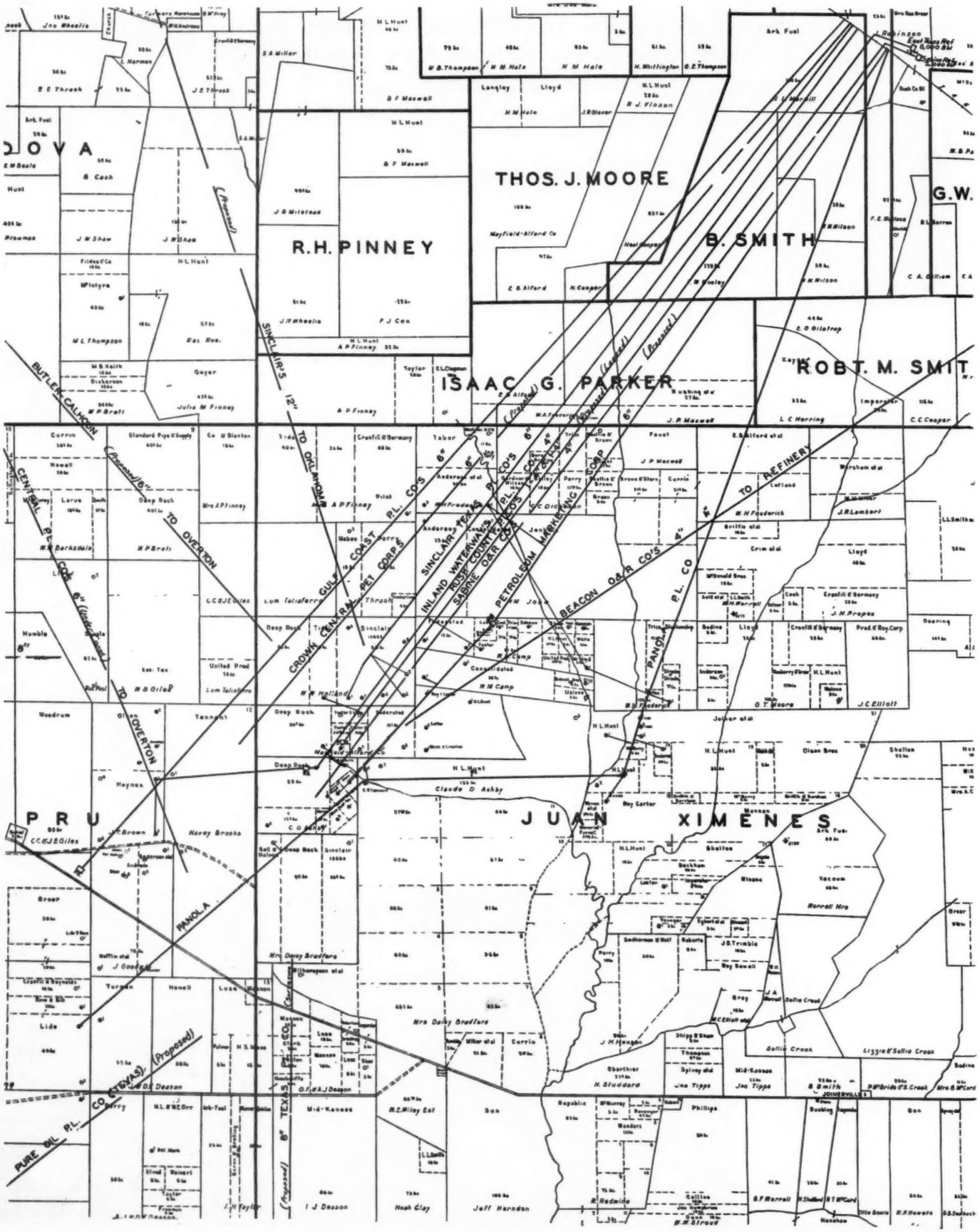
GREGG COUNTY

Arkansas Fuel Oil Co.'s No. 1 R. S. McKinley, 990 ft. from N and W of most northern cor. 212-ac. tract, William Robinson Sur. .... Coring 3,565 ft.
Ealick's No. 1 Church Lot, 150 ft. N and 150 ft. W of N 15 acres, Dolores Sanches Sur. .... Drlg. 2,705 ft.
Bell & Graddy's No. 1 M. George (or Daniels), 225 ft. S and 650 ft. W of 26-ac. tract, Mary Van Winkle Sur. .... Drlg. 1,432 ft.
W. H. Byrd, Jr.'s No. 1 Art Mitchell, 150 ft. from E and 150 ft. from S of 15-ac. lease, 1,300 ft. from S and 850 ft. from E of survey, John Carithers Sur. .... Rig up.
D. H. Byrd and Gulf Prod. Co.'s No. 1 Canimaras Bros., 5,505 ft. from NW, 1,528 ft. from NE of 817.6-ac. tract, 1,820 ft. from N, 2,505 ft. from W of survey, Harden Edwards A-64 Sur. .... Rig up and shut down.

(Continued on Page 106)

Picture of part of the Joiner Field, Rusk County, showing three of the six pipe lines serving the field. Arrows mark lines. The Fairchild Aerial Survey, Inc., Dallas, Tex., has taken many such pictures of the fields, and has mapped several hundred square miles of this district.

Pipe Line Map of the Joiner Field, Rusk County



Showing lines laid to railroad, lines under construction, lines under survey and proposed lines to field. Three refineries now under construction are also shown on railroad north of field.

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GENERAL OFFICES: HOUSTON, TEXAS

Andrews County Test Seems Dry Hole

Wheat Field Has One of Its Best Wells. Ward County's Grand Falls Shallow Pool Getting Attention. Panhandle-Wichita Quiet

By L. E. Bredberg
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., Mar. 9.—Deep Rock Oil Co., the California Co. and Atlantic Oil Producing Co.'s No. 1 Kuykendall in the SW of Section 24, Block A-46, Andrews County, looks like a dry hole limiting the Ogden Field to the east. The test is now shut down for orders at a total depth of 4,648 feet after testing for 10 hours, making only 3 bbls. of fluid per hour, of which 75 per cent was sulphur water, the water coming from 4,630-33 feet. A small amount of oil was logged at 4,245 feet and increase was encountered at 4,315-26 and 4,473-77 feet, but commercial quantities were not found, and it is doubtful whether a shot would help production to a commercial amount. Consequently the test will probably be abandoned.

Three miles east of the Hendricks Field, Winkler County, the Magnolia Petroleum Co. is completing its No. 1 Bashara for an initial production of 25 bbls. on the pump, at a total depth of 3,109 feet. Top of the pay in this well, which is an east offset to a gas well, was logged at 3,073-83 feet, with an increase showing from 3,091-99 feet, where the hole filled 1,900 feet with oil in 24 hours.

Wheat Field Well

Douglas, Martin and others' No. 1 Wheat and Ramsey in Section 83, Block 1, W.&N.W. Survey in the Wheat Field, Loving County, was completed as one of the best wells in the field, making an initial production of 700 bbls. per day from pay topped at 4,178 feet. Total depth of the hole was 4,218 feet, but it was plugged back to 4,217 feet and shot with 180 quarts from 4,178-4,217 feet. This well is in one of the most active fields or areas of the Permian Basin, and there are 17 active tests in the area and county.

Ward County, centering around the small and shallow pool at Grand Falls, is getting the most attention in the basin at the present time, there being six locations staked this week in this pool. This activity is due to the wells being comparatively shallow, around 2,300 feet, flowing when they come in and not requiring a shot, and the last few wells drilled showing up for 100 bbls. initial production or better. The oil is from a sand, and the field is not under proration. As a consequence there are 12 active tests in the pool at this writing. The Atlantic Pipe Line Co. has a line into the Shipley Pool, 2 miles to the north, and a small gathering line into the Grand Falls Pool. The oil is run to the company's main line in Winkler County.

Humble Oil & Refining Co. completed one of the most interesting tests in western Pecos County this week on the Kokernot ranch. This test was abandoned as dry at a total depth of 6,170 feet, a difficult fishing job preventing carrying the hole any deeper. The test is in the NW of Section 227, Block 10, G.H.&S.A. Survey.

Mid-Kansas Oil & Gas Co.'s No. 1 Goode in Section 26, Block 161, G.C.& S.F. Survey, southeastern Terrell County, has encountered no increase in gas since drilling below 5,606 feet where it picked up 6,500,000 feet. It is now drilling below 5,650 feet in sandy lime.

Menard County Test

Eastern Menard County is to receive an interesting test in Section 455, E. Henkel Survey, on the F. Brandenberger ranch. Voss, Bryan and others are to drill the test and have contracted to drill two others on the block which lies in eastern Menard and western Mason Counties. The tests are to go to the granite unless production is encountered.

Production in the Penn Pool, Ector County, fell off from 223,424 bbls. in January to 176,919 bbls. in February, while production in Howard-Glasscock County pools increased to 875,241 bbls. during February, showing a daily average of 31,257 bbls. This is a total of 73,000 bbls. over January.

PANHANDLE-WICHITA FALLS

Operations in the Panhandle district have simmered down to the drilling of offsets only.

The main feature in the Wichita Falls district was the cutting of crude prices. This district has been in the throes of proration for the past year, with many of the wells unconnected, and the operators striving to get at least 4 bbls. taken from each of their producers, regardless of size, but due to its geographic location oil from this district has not been in much favor, the low prices for East Texas crude making it much more desired.

The new potential of the Panhandle district for the period from March 1 to March 16, 1931, is 39,990 bbls., the district having a potential of 141,775 bbls. from a total of 1,977 wells.

NORTH TEXAS PRODUCTION
Week Ending March 7

Panhandle district—	Bbls.
Carson County	3,780
Hutchinson County	9,845
Gray County	39,065
Moore County	250
Potter County	0
Wheeler County	484
Total production this week	53,424
Total production last week	53,175
Increase	249
Wichita Falls district—	
Archer County	12,819
Baylor County	841
Clay County	629
Cooke County	2,198
Foard County	69
Jack County	750
Haskell County	24
Montague County	3,907
Throckmorton County	361
Wilbarger County	10,091
Wichita County	20,481
Young County	12,477
Total production this week	64,647
Total production last week	65,016
Decrease	369
Ranger district—	
Brown County	3,798
Callahan County	1,544
Coleman County	1,501
Comanche County	710
Palo Pinto County	332
Eastland County	3,056
Shackelford County	3,886
Stephens County	4,702
Total production this week	19,529
Total production last week	19,251
Increase	278

COMPLETIONS IN PANHANDLE DISTRICT

Gray County

Barker and Bourland's No. 1 Dial, total depth 3,003 feet, plugged back to 2,840 feet, top pay 2,535-2,820 feet, initial production 2,000,000 feet of gas. Adams and McGahey's No. 5 Morse, shot 20 quarts 2,580-90 feet, initial production 150 bbls. on swab, total depth 2,675 feet. Dixon Creek Oil & Refining Co.'s No. 9 Castleberry, top pay 3,224-79 feet, shot 180 quarts, initial production 80 bbls., total depth 3,279 feet.

Carson County

Oschsner's No. 1 Moore, top pay 2,520-2,725 feet, initial production 53,000,000 feet of gas, total depth 2,750 feet.

COMPLETIONS IN NORTH CENTRAL TEXAS

Week Ending March 7

Archer County

Moran Drilling Co.'s No. 1 Davidson, dry and abandoned, total depth 802 feet.

Collins County

Breckenridge Oil Co.'s No. 1 McPheran, dry and abandoned, total depth 593 feet.

Throckmorton County

York and others' No. 1 Brockman, temporarily abandoned, total depth 1,300 feet.

Wichita County

R. R. Clark and others' No. 13 Bickley, oil sand 866 feet, initial production 77 bbls., total depth 866 feet.

Young County

Banner and others' No. 1 Routon, dry and abandoned, total depth 905 feet. Brazelton and others' No. 1 Masonic Homes, dry and abandoned, total depth 800 feet. G. B. Chandler's No. 1 Fisher, dry and abandoned, total depth 802 feet. Deats and Elli's No. 1 Jeffery, dry and abandoned, total depth 927 feet. Deep Oil Development Co.'s No. 1 Furr, Adam, dry and abandoned, total depth 1,200 feet. F.H.E. Oil Co.'s No. 8 Finch Estate, oil sand 656-68 feet, initial production 170 bbls., total depth 668 feet. Kliner and Rigg's No. 6 Larimore, dry and abandoned, total depth 754 feet. Maer and Martin's No. 1 Eichelberger, dry and abandoned, total depth 901 feet. Mollenkph and others' No. 1 Larimore, dry and abandoned, total depth 740 feet. Nix and Dale's No. 3 Daniel, oil sand 870-77-81-86 feet, shot 10 quarts, initial

(Continued on Page 149)

WILDCAT OPERATIONS IN WEST TEXAS

Week Ended March 9

ANDREWS COUNTY

Company, well, farm name, section and block—	Remarks—
Deep Rock Oil Co. et al's No. 1 Kuykendall, 2,310 ft. from N and E of SW cor., Sec. 24, School Blk. A-46	Shut down 4,648 ft.
Deep Rock Oil Co. et al's No. 1 King, 330 ft. from N and 2,310 ft. from E, Sec. 11, Blk. A-46	Top pay 4,335 ft.; flows every 4 days; temporarily abandoned; total depth 4,454 ft.

BREWSTER COUNTY

Brewster Oil Co.'s No. 1 fee, 2,640 ft. S and 2,598 ft. E of NW cor., Sec. 45, Blk. G-15, G.C.&S.F. Sur.	Shut down 1,935 ft.
E. L. Chapman's No. 1 Skinner, C SW SE, Sec. 100, Blk. 2, G.C.&S.F. Sur.	Shut down 1,302 ft.
Trans-Pecos Oil & Gas Co.'s No. 1 Jones, 920 ft. from N and 2,500 ft. from E of Sec. 18, Blk. G-15, G.C.& S.F. Sur.	Drlg. 2,800 ft.
Van McPhail's No. 1 McIntyre, SE cor., Sec. 59, Blk. 352, 7 miles S of Alpine	Shut down 1,750 ft.

COKE COUNTY

Reed, Hitchens et al's No. 1 Duncan, 1,980 ft. from S and 1,680 ft. from E of Sec. 239, Blk. 2, H.&T.C. Sur. (4,500-ft. cable test)	Shut down 30 ft.

CONCHO COUNTY

Beesley et al's No. 1 Waring estate, 400 ft. from N and E, Sec. 163, T.&N.O. Sur.	Shut down 267 ft.
Turner et al's No. 1 Borsig, 150 ft. from S of NE cor. G. Emmig Sur. 130, 6 miles W of Paint Rock	Drlg. 1,820 ft.

CRANE COUNTY

Cranfill Bros. and Gulf's No. 1 J. B. Tubb, 2,310 ft. from N and 330 ft. from E of Sec. 3, Blk. B-27, Public School Land	Drlg. 5,056 ft.
Cranfill Bros.' No. 1 Muir, 330 ft. from N and 2,310 ft. from W, Sec. 23, Blk. B-27, Public School Land	Drlg. 4,370 ft.

CROCKETT COUNTY

Doleman & Moore's No. 1 Perner, 3,135 ft. from N and 1,485 ft. from E of Sec. 26, Blk. 2, I.&G.N. Sur.	Spudded and shut down.
Taylor-Link Oil Co.'s No. 1 Mary Bullock et al, 330 ft. from N and E of Sec. 41, T.C. Sur.	Plugged back to 2,680 ft.; prepare to shoot.

CULBERSON COUNTY

Cranfill Bros. and Sholts' No. 1 Seay, 2,310 ft. from S and W, Sec. 45, Blk. 60, Public School Land	Shut down 1,365 ft.

(Continued on Page 111)

WILDCAT OPERATIONS IN TEXAS PANHANDLE

Week Ending March 9

CARSON COUNTY

Company, well, farm name, section and block—	Remarks—
Continental Oil Co.'s No. 1-A Jordan, 330 ft. S, 1,320 ft. W, SW, Sec. 123, Blk. 4, I.&G.N. Sur.	Drlg. 2,950 ft; oil sand 2,885-88 ft.
Krebs & Barnard's No. 1 Barnard, 660 ft. S and W, NW, Sec. 24, Blk. 4, I.&G.N. Sur.	Fishing 3,220 ft; estimated 100 bbl. from pay 3,212-18 ft.
North American O. & G. Co.'s No. 1 Burnett, 1,341 ft. S, 662 ft. E, of S E½ SE, Sec. 80, Blk. 4, I.&G.N. Sur.	S.D. 630 ft.
Plains Holding Co.'s No. 1 M. P. Co. fee, C N 10 ac., N½ NW SW, Sec. 40, Blk. 4, I.&G.N. Sur.	Spudded.
Plains Holding Co.'s No. 1-A Kolka, 660 ft. N, 710 ft. E, NE NE, Sec. 43, Blk. 4, I.&G.N. Sur.	Drlg. 2,650 ft; 50,000,000 ft. gas.
Red River Gas Co.'s No. 5-A Bivins, 1,320 ft. S, 660 ft. E, Sec. 45, Blk. B-20, G.&M. Sur.	Drlg. 450 ft.
Texas Interstate P. L. Co.'s No. 1 Burnett, C E½ SE, Sec. 51, Blk. 5, I.&G.N. Sur.	Spudding.

CHILDRESS COUNTY

C. L. Sloane et al's No. 1 B. P. Smith, Sec. 49, F.P. Knott lands	T.D. 5,000 ft.

COCHRAN COUNTY

Continental Oil Co.'s No. 1-B Slaughter, 4,950 ft. N and E, of League 134, Armstrong County School Lands	Drlg. 4,085 ft.
Continental Oil Co.'s No. 1-B Slaughter, 495 ft. N, 4,950 ft. E of lease Armstrong County School Lands, Sec. 33, Blk. B-2	Drlg. 500 ft.

COLLINGSWORTH COUNTY

Dixon et al's No. 1 Bell, 330 ft. N, 1,320 ft. W, Sec. 102, Blk. 21, H.&G.N. Sur.	U.R. 12½-in. csg. at 535 ft.

COTTLE COUNTY

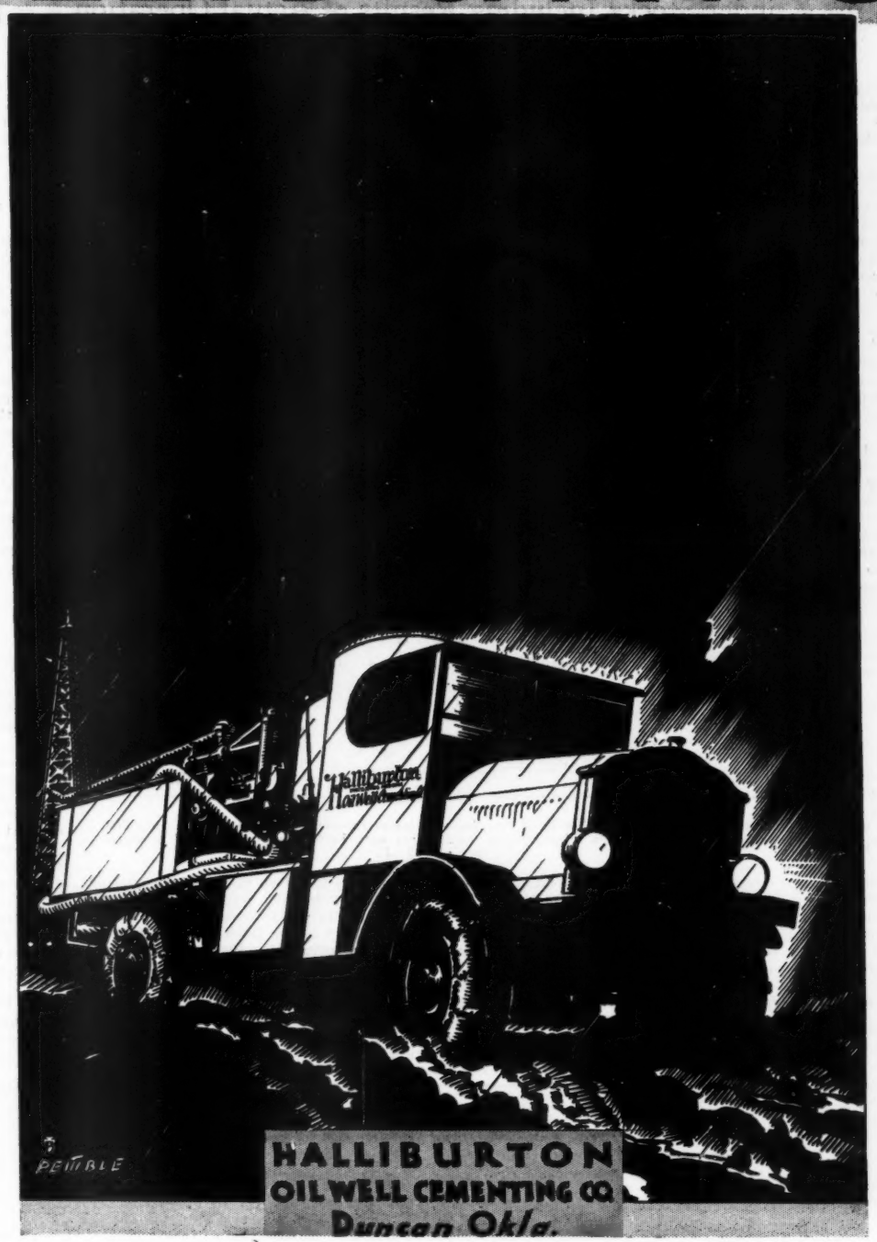
Darby Oil Co. and Merry Bros. & Perrin's No. 1 Richards, 330 ft. NE, Sec. 13, B.S.&F. Sur.	U.R. 8-in. csg. 3,265 ft.

GRAY COUNTY

Adams, Prince et al's No. 1 Morse, 330 ft. NE SE, Sec. 6, Blk. 26, H.&G.N. Sur.	Drlg. 2,280 ft.
Anderson et al's No. 2 Vollmert, 330 ft. N and W, SW, Sec. 140, Blk. 3, I.&G.N. Sur.	Rig.
Beck's No. 1 Sullivan, 330 ft. N and E, W½ NW, Sec. 135, Blk. 3, I.&G.N. Sur.	Drlg. 3,056 ft.
Boyles et al's No. 1 Colebank-Morse, 330 ft. NE, Sec. 65, Blk. 25, H.&G.N. Sur.	Spudded and S.D.

(Continued on Page 110)

HALLIBURTON



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Atmospheric and Vacuum Distillation

Modern Practice in the Production of Overhead Cylinder Stocks Including Results of Actual Operation

By John Primrose
Foster Wheeler Corp.*

Preliminary to the consideration of some actual operating results obtained in processing Mid-Continent crude, the following brief description of equipment is presented in as much as the features which will be referred to have a direct bearing on the results obtained.

It is necessary to heat the crude to temperatures approaching 800° F., or in some cases even higher, to drive overhead the last of the lubricating stock obtained in the crude. The construction of the heater is of prime importance in order to reach these temperatures without destroying some of the valuable products which are most easily overheated. Another requirement is high overall thermal efficiency of the heater to insure the minimum fuel consumption, and, in addition, the heater must respond readily and positively to changes in adjustment without being oversensitive to small fluctuations in operating conditions, which it is impossible to avoid entirely in plant operation. In the earlier designs heat was absorbed from the furnace almost entirely by convection, whereas today nearly all of the heat is absorbed by radiation, and convection is only used to recover heat remaining in the furnace gases after they have been cooled to comparatively low temperatures as a result of heat absorbed through radiation. Radiant heat absorbing surface is exposed directly to flame radiation and must be sufficient in extent to prevent too high a transfer rate to the oil when the quantity of air supplied for combustion is barely sufficient to insure complete combustion of the fuel. This surface must be located at some distance from the burning fuel so that flame impingement is prevented and concentration of heat rays is avoided. Even distribution of heat rays over the surface exposed to radiation is advisable to secure uniform heating.

The furnace gases having been cooled through radiation are then passed rapidly over the tubes of the convection bank, through which the oil to be heated flows in a direction contraflow to the furnace gas. Thus the furnace gases are cooled to within nearly 100° F. of the temperature of the oil entering the heater and 70 to 80 per cent of the heat value of the fuel is absorbed by the oil. In cases where the temperature of the oil entering the heater is above 550° F., the heat remaining in the flue gas after leaving the heater is often recovered by preheating the air supplied to the furnace for combustion.

Avoid High Temperatures

Furnace volume is an important consideration, and it has been found desirable in practice to provide for a considerably lower rate of heat liberation than is used in boiler practice. This avoids the intense heat of a boiler furnace and insures uniform absorption essential to uniform and well controlled heating of the oil.

This requirement often necessitates furnace walls of considerable area. These are best constructed of the sectional type, supported on steel and air cooled when the service required of the heater necessitates frequent starting and shutting down. Otherwise solid walls of good material, strongly bonded but with ample provision for expansion will last indefinitely.

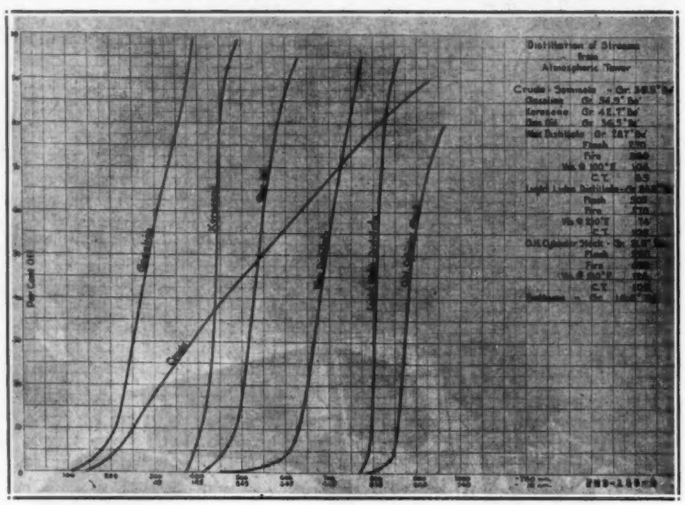
When heating oil to near the critical temperature, it is desirable to supply latent heat of vaporization in the heater as vapor is formed. Otherwise it would be necessary to heat the oil beyond the temperature required to produce the desired vaporization because the latent heat required in the flash chamber can only be supplied by heating the oil in the heater to a temperature in excess of that which is necessary in the flash chamber for the desired vaporization. By supplying latent heat of vaporization in the heater, the final temperature to which it is necessary to heat the oil is less, but is necessary to provide room for the increasing volume of oil and oil vapor as vaporization takes place. Otherwise vaporization would be suppressed by the pressure generated. More volume for the oil and vapors is provided by using tubes of larger diameter as the outlet of the heater is approached, at which point the greatest volume of vapor exists.

Referring to the accompanying flow chart, the hot oil and vapors pass to a vapor separating and fractionating tower. Oil and vapor enter the tower tangentially below the first baffle assembly where the liquid is separated and drops toward the bottom of the tower, passing over several trays in the bottom section of smaller diameter where, in its downward path, it encounters a current of steam, and so it is stripped of light fractions. A float indicator is used to regulate the liquid level which, together with the reduced diameter, insures the hot bottoms being removed from the tower in the shortest possible time. The rising vapors pass through the first baffle assembly and flow on upward through a series of bubble trays. The heavier vapors are condensed by contact with reflux and removed as side streams and only the lightest vapors reach the top from which they are removed through the vapor line to heat exchangers and condensers.

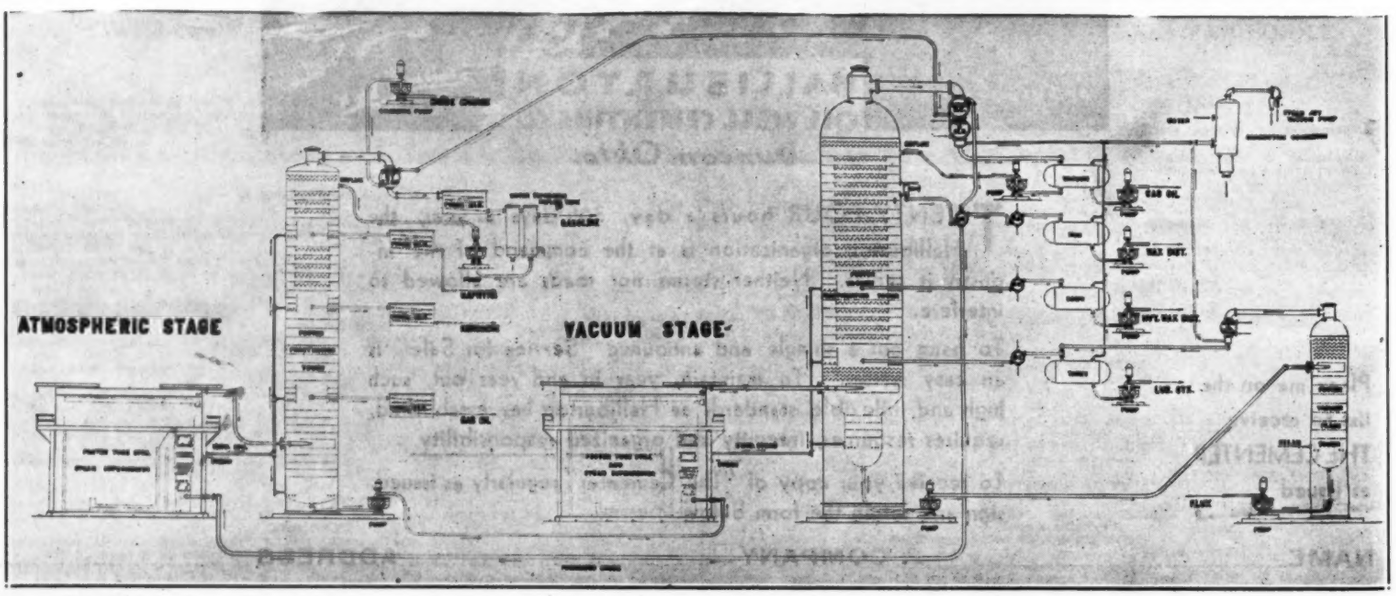
Tower Control

The top of the tower temperature is controlled by pumping back condensate onto the top tray, producing reflux which flows downward from tray to tray gradually becoming heavier. At intervals in the downward flow of the reflux, side streams are withdrawn either direct from the plate or after passing through stripping sections where, out of contact with vapor passing upward through the tower, the side stream to be removed is stripped of light fractions by steam. The balance of the reflux not removed as a side stream is by-passed around the stripping section and continues down through the tower. The quantity of the side stream removed is controlled by an adjustable valve which can be set to remove a predetermined proportion of the reflux quite independently of the total quantity flowing down the tower. Thus the valve once set for a given set of operating conditions, it is only necessary to pump back onto the top plate enough condensate to maintain

(Continued on Page 131)



Curves made from distillation of samples of streams recovered from atmospheric distillation of Seminole crude when running to 15.9 per cent bottoms with tube still temperature of 750° F.



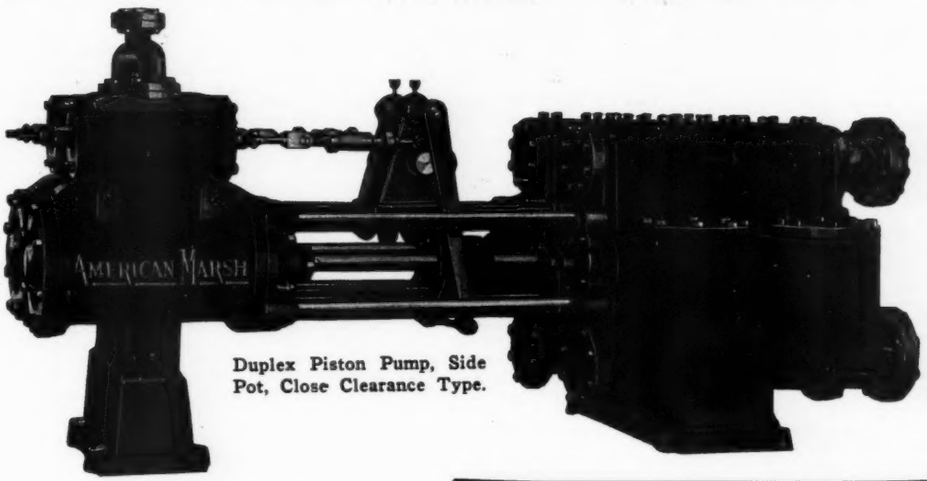
Two-stage atmospheric and vacuum unit.

*Presented before the Western Petroleum Refiners Association convention in Excelsior Springs, Mo., March 10, 11 and 12.

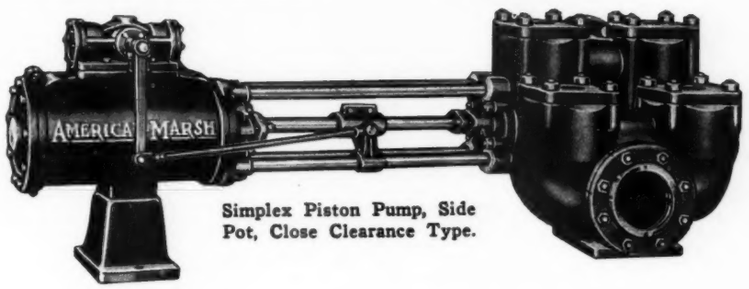
Designed Specifically for Oil Refinery Applications

MINIMUM CARE

All bushings are renewable, and can be replaced in minimum time. All stuffing boxes are extra deep to take maximum packing. All working parts are readily accessible. Thus the attention and maintenance necessary to keep these pumps in first class operating condition is greatly reduced.



Duplex Piston Pump, Side Pot, Close Clearance Type.



Simplex Piston Pump, Side Pot, Close Clearance Type.

CLOSE CLEARANCE

The pots are located close to the ends of the cylinders, making the distance between the suction and discharge valves and the cylinder barrels very short. Also, the fluid pistons at the ends of the stroke travel very close to the heads, reducing to absolute minimum the clearance in the fluid end. Thus gasoline, kerosene, naphtha, etc., can be handled without any danger of the pumps becoming vapor bound.

With Many Important and Desirable Features

THESE new American-Marsh Pumps are the result of extensive experimental work. As now perfected they are, we believe, the finest steam pumping equipment offered for oil refinery applications.

The general design is backed by sound engineering plus a thorough understanding of the particular requirements of your field. The construction embodies strength and ruggedness beyond customary standards together with the greatest simplicity possible.

And still another highly important feature is the fact that we build these pumps exactly as you want them built. The entire fluid end can be of the material specified, while the pump valves and packing can be of the design and material that meet your needs best.

The line is complete. From the wide range of sizes offered — 98 different pumps—can be selected equipment to meet practically any refinery pumping requirement, large or small.

WRITE FOR BULLETIN

Illustrated Bulletin 66 gives complete information and performance data on this new and improved line — a reference book worth having. Write for your copy today.

We invite your inquiry and investigation, and we assure you that it will be time well spent. AMERICAN STEAM PUMP COMPANY, Battle Creek, Michigan.

AMERICAN MARSH

CENTRIFUGAL and STEAM PUMPS

Pipe Line Construction News

PIPE LINE SURVEYS IN EAST TEXAS AREA

FORT WORTH, Tex., Mar. 9.—The Texas Pipe Line Co. is surveying for a line from a connecting point on its Corsicana-San Augustine 8-inch in Nacogdoches County to the Joiner Field, Rusk County, and contemplates laying a common carrier. This line will cover about 33 miles, but the size of the line has not been announced.

The Magnolia Pipe Line Co. has 7 miles of 8-inch laid from its main pumping station in the John Grock Survey, Gregg County, towards the company's main line station at Center in Shelby county. This line will be 58 miles in length, and is being acetylene welded. It will serve the Pine Tree Pool in Gregg County and the Kilgore Field in northern Rusk County, the company to perform common carrier service out of these two fields.

The Pure Oil Pipe Line Co. is surveying for a contemplated line from its Teague (Colonel) Station in Freestone County to the Joiner Field in Rusk County, a distance of 90 miles. Size of line and other details have not been given out by officials of the company.

The Tyler Pipe Line Co.'s 8-inch, being constructed by Murchison & Constantin of Dallas, and which has been reported as planned to serve the Joiner Field and deliver crude to the Taylor Refining Co.'s 15,000-bbl. refinery now under construction in Tyler, will not serve that field, but will be laid to the Kilgore Field in the northern part of Rusk County.

The Crown Central Pipe Line Co. has started the laying of a 6-inch line from the Joiner Field to Friar's Switch on the I.&G.N. Railroad, 3½ miles north of the field where it will build a 40-car loading rack from which it will ship out Joiner crude to Houston. A refinery is also proposed by the company to be located near the loading rack. N. A. Saigh & Co. of San Antonio are constructing the line. This company also constructed Sinclair-Texas Pipe Line Co.'s 6-inch from the field to Friar's Switch.

The Gulf Coast Pipe Line Co. which will serve the Moody-Seagraves' leases in the western part of the Joiner Field, has almost completed its 6-inch line to Friar's Switch where a loading rack is being constructed. Joiner crude will also be shipped to Houston from this loading rack.

The Farrell-Lathrop area is promised several small lines to loading racks on the T. & P. Railroad, the Simms Oil Co. of Dallas and Cranfill and Germany being mentioned as having planned small lines to serve their leases. The former company will ship its oil to its refinery in West Dallas.

ARIZONA GAS LINE

FORT WORTH, Tex., Mar. 9.—The Western Gas Co., which is laying a natural gas line from El Paso, Tex., to Douglas, Bisbee and other Arizona cities, will construct a $250,000 compressor station just west of the city of El Paso. Gas for this main is coming from the Panhandle of Texas and wells in the southeastern part of New Mexico, mainly in Lea County.

BEEVILLE-SKIDMORE LINE

HOUSTON, Tex., Mar. 7.—Houston Pipe Line Co. has completed laying 10 miles of 2-inch line from Beeville, Bee County, to Skidmore. The line will carry gas from the company's trunk system for distribution in that town.

ATLAS PIPE LINE CO. SURVEY IN EAST TEXAS

SHREVEPORT, La., Mar. 9.—Organization of the Atlas Pipe Line Co., Inc., is announced here, for the purpose of constructing and operating an 8-inch line from the East Texas Field to Shreveport. Survey of the route is under way and it is to run from this city to a point south of Longview, Tex. The new line will supply the refinery here of the Shreveport-El Dorado Pipe Line Co., and possibly other local refiners with East Texas crude. The line will have a daily capacity of 18,000 bbls. with one pumping station, and actual construction is to be started as soon as the survey is completed. Officers of the new company are: E. R. Ratcliff, president; S. D. Hunter, vice president and chairman of the board of directors; B. H. Gray, vice president and treasurer, and J. B. Atkins, secretary, all of Shreveport. The board of directors, in addition to these officers, will include: J. K. Wadley, Texarkana; J. W. Olvey, El Dorado, Ark.; R. T. Moore, Guy Oakes, W. C. Woolf, C. D. Keen, J. B. Beaird, J. S. Reily and William L. Christman, all of Shreveport. The line will be approximately 70 miles in length and will be constructed at an estimated cost of $700,000.

ADDITIONAL 100 MILES CONTRACT IS AWARDED

An additional order for 100 miles of 24-inch gas pipe line amounting to 23,000 tons has been awarded by the Continental Construction Co. to A. O. Smith Corp. to be used in the gas line from the Texas Panhandle and from the Hugoton gas field in Stevens-Morton Counties in southwestern Kansas to Chicago. This brings the total orders received by A. O. Smith Corp. to 550 miles. The total length of the main line will be 950 miles of which approximately 585 miles have been completed. The laying of 2,000 miles of lateral is expected to be started in the near future. The line will take gas from the gas fields of Texas and Oklahoma and deliver it to Chicago, Milwaukee, Des Moines and Omaha and other smaller cities.

NEW AMARILLO GAS LINE

FORT WORTH, Tex., Mar. 9.—The Huber Petroleum Co., subsidiary of the Huber Corp., manufacturer of carbon black, which has many plants in the Panhandle and Ranger districts of Texas, also owning 10,000 acres of gas-producing lands with 17 wells now producing around 500,000,000 feet of gas per day in Hutchinson County, has signed a contract with the city of Amarillo to furnish that city with gas. This came about because the city could not obtain the desired reduction in gas rates from the Amarillo Gas Co., subsidiary of the Prairie Oil & Gas Co., which has had a franchise in the city up to the present time.

A 6-inch line will carry gas 40 miles from the Huber properties to Amarillo, and a larger main will be laid when necessary.

WILL USE DILLON COUPLINGS

To correct an error we are asked to say that Dillon couplings will be used in the Central Pipe Line Co.'s 6-inch line to be built from the Joiner Field in Rusk County, Texas, to a loading rack near Overton, Tex.

MUSKOGEE-OKMULGEE GASOLINE LINE BEGUN

The actual construction work on the laying of the 4-inch gasoline line from Muskogee to Okmulgee was started during the week. The Southwestern Construction Co. has the contract. The line is the extreme southeast portion of the Great Lakes Pipe Line Co.'s gasoline line which extends to Chicago.

Construction work has also started on the pump station which will be erected 1½ miles south of Muskogee. The completion of the laying of the line and the building of the pump station is expected to be completed in approximately six weeks.

The survey of the 4-inch line was made several months ago, part of the pipe was strung along the ground and ditching was started during the week. When the materials arrive for the construction of the tanks, these will be erected first and the construction of the power plant will follow.

The site of the power plant will be about 1½ miles south of the Pure Oil Co. refinery and the site is a 20-acre plot of ground on which four 6,400-bbl. tanks will be erected to be used for storage purposes and on the same site the power plant will be erected. In two months the entire project is expected to be in operation. The size of the power plant has not been determined. The entire project, including the right of way, surveying, pipe laying and power plant, was estimated to cost $1,000,000.

SASKATOON DEFEATS FRANCHISE PROPOSAL

CHATHAM, Ontario, Mar. 7.—Burgesses of the city of Saskatoon, Saskatchewan, voted down the proposal, tentatively approved by the city council, to grant a natural gas franchise for a period of 20 years to Tri-Cities Utilities, Ltd., of Regina. While a two-third majority was required to sanction the franchise, the actual vote was 2,645 in favor and 2,827 against, a hostile majority of 182. Tri-Cities Utilities, Ltd., was organized by C. O. Moore and associates of New York, and proposed to pipe gas to Saskatoon and Regina from the Kinsella Field in eastern Alberta.

The company holds a franchise for a similar period from the city of Regina. Application was made some weeks ago to the Alberta provincial government for a permit to lay the necessary export pipe line from the Kinsella Field to the Saskatchewan boundary, but up to the time of the Saskatoon vote no decision on this application had been announced by the Alberta government. The company also planned to build a lateral transmission line to serve the city of Moose Jaw, but no agreement had been reached with that city.

No announcement has yet been made as to what further steps will be taken to develop the Saskatchewan pipe line project.

JONES AND RIGGS LINES

FORT WORTH, Tex., Mar. 10.—Work is well under way on the 6-inch pipe line to the Jones Pool in Moore County to Altman, where the Apache Refining Co. is building a plant to process the crude from this newly drilled field, and the plant is to be ready by around April 1.

The Olney Oil & Refining Co. has started to lay its 4-inch line from its refinery at Olney to the Riggs Pool near New Castle in northern Young County, a distance of 12 miles.

BUTTE AND ANACONDA LINE FROM CUT BANK

DENVER, Colo., Mar. 9.—Another step towards the construction of a natural gas system to supply the cities of Butte and Anaconda, Mont., and smelting plants in that vicinity was reported from Butte to the effect that the Montana Power Co. and the Anaconda Copper Mining Co., on one hand and Louis P. O'Neill, on the other, had signed contracts for gas from the Cut Bank area in Glacier County, northern Montana. Efforts to build a line to these markets have been made repeatedly during the past few years, the negotiations principally being to pipe gas from northern Wyoming into central Montana. The Montana Power Co., a public utility company serving a large number of Montana communities, obtained franchises for natural gas in a number of cities and towns. The Ohio Oil Co., likewise, obtained some franchises and made considerable progress towards building the project, but in recent months there appeared to be a lull in the negotiations.

During 1930 a prospective gas field north of Cut Bank, in Glacier County, in northern Montana, was opened. Four gas wells have been completed, but these are widely scattered and considerable developments will be required to determine the area of the gas production and the reserves that may be depended upon. Denver reports are to the effect that the Montana Power and Anaconda Copper interests have contracted to take gas from the Cut Bank area if delivered at the market and Mr. O'Neill agrees to the construction of the line. It is understood that the O'Neill interests plan to drill at least 20 wells to determine the available reserves and open production sufficient to meet the demand. The Texas Production Co. has a large acreage scattered through the Cut Bank area and before any construction is begun that company's position probably will be taken into consideration. One of the producing wells, rated at 6,000,000 feet a day or better, was drilled by Jerome Drumheller in his No. 1 Yunck, C SE NW, Section 1-34-6w. This interest has been engaged for some time in negotiating a market outlet toward the west from the Cut Bank Field. Another well drilled by Hill & O'Neill, which had 15,000,000 feet of gas at 2,750 feet, was their No. 1 Michaels, C SE SE, Section 28-36n-5w. The Texas Production Co. has a 4,000,000-foot well in its No. 1 Small, NE SW SW, Section 13-35-6w, 3 miles from the Hill & O'Neill well. These and one other well give a developed production of around 33,000,000 feet of gas per day with the productive area remaining to be determined. The projected line will be better than 200 miles long and will cost $10,000,000 to $12,000,000 to construct. It is estimated that the cost will be at least $3,000,000 less than if the gas is piped from Wyoming.

WYOMING-NEBRASKA BIDS

DENVER, Colo., Mar. 9.—J. M. McIntire, general manager of the New York Oil Co., has gone to New York with bids recently received for the construction of the projected 378-mile natural gas line from the Fremont County, Wyoming, gas fields to western Nebraska, with a lateral to Laramie, Wyo. It is understood that before making any award of contracts all franchises and contract matters will be carefully canvassed and it is possible actual construction will be held up until some negotiations with industrial consumers now pending are closed. It is believed these matters will be cleared up within a few weeks and that contracts will be awarded and construction started in time to complete the project the coming summer.

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Small Completions in the Eastern Fields

Thirty-one in Lower Fields; Only Four Oil Producers. Most Wells Finished in Ohio and West Virginia Gassers

By Staff Correspondent

PITTSBURGH, Pa., Mar. 9.—During the week in the lower eastern fields, there were 31 completions; none of any size nor of any special interest in location. Of this total, 19 were gassers, 8 were dry holes, and 4 were oil producers with an initial production of but 45 bbls.

Southeast Ohio had but three completions, one showing for a fair well. In the southeast quarter of Section 6, Hopewell Township, Muskingum County, the Preston Oil Co. completed a test on the M. Leasure farm in the Clinton sand at a depth of 3,050 feet. The well produced 35 bbls. the first 24 hours natural and is not to be shot at this time. In this district, this well gives indication of a fair producer after shot, but with the present overproduction of crude, the oil will be conserved in the ground.

In the northwest quarter of Section 32, Marion Township, Noble County, the Ohio Fuel Gas Co. completed a test on the W. W. McClintock farm. It was drilled in the Berea Grit at a depth of 1,802 feet and is showing for 200,000 feet of gas. In Section 16, Chatham Township, Medina County, and on Lot 20, E. R. Edson and Son Co. drilled No. 13 on the M. A. and Eva Franks farm to a depth of 450 feet and the Cow Run and Buell Run sands proved dry in this hole.

Drilling in Ohio

In Perry County, the Mid East Co. has reached 1,500 feet in a second test on the Ed Brown farm, Section 11, Reading Township. There are 4 rigs standing in this county but which have not yet been started: The Wehrle Co. on the Wolf Heirs farm, Section 31, Clayton Township; W. G. Perrigo and Co. for No. 6 on the J. A. and W. E. Donnelly farm, Section 1, Jackson Township; Wm. Cline and others, a test on the Howard H. Doyle farm, Section 3, Clay Township; and David L. Melick, Trustee, a test on the H. E. Stoneburner farm. Section 18, Harrison Township. In Madison Township, the Atha Oil Co. is down to 2,850 feet in No. 17 on the Melick Brothers farm, Section 20. In Muskingum County, James E. McLaughlin is shut down at 950 feet waiting on water to continue his No. 7 on the Richard Boyce farm, Section 13, Monroe Township.

In Monroe County, M. Stoffel and others abandoned their rig on the M. Stoffel farm in Section 11, Bethel Township. It was to have been No. 3 on that farm. In the same township, Lois A. Timblin and others are drilling on the C. J. Bode farm in Section 35. In Salem Township, the Wittmer Oil and Gas Properties is at 1,150 feet on the Mary Lehner farm, Section 11, and there was no showing in the same operator's test in the Injun sand at 1,810 feet on the Charles B. Sawyers farm, Section 15, Green Township.

In Coshocton County, the Preston Oil Co. has rigged up on the Cochran Heirs farm, Section 21, Newcastle Township. In Hocking County, the Kackelmacher Estate is drilling a second test on the Carshner and Scholl farm, Section 15, Falls Township. In Licking County, the Pure Oil Co. is down to 2,100 feet in a second well on the Lavirtie Earhart farm, Section 7, Hanover Township. In Holmes County, the Ohio Fuel Gas Co. has reached 1,550 feet on the Clark Miller farm, Section 11, Washington Township. In Vinton County, Powers and Henry are at 300 feet in a second well on the Cameron S. Clark farm, Section 4, Knox Township. The Associated Oil and Gas Co. has a rig on the ground on the A. L. Jones farm, Section 4, Starr Township.

WEST VIRGINIA

The usual small number of oil wells was completed in West Virginia during the week. In Proctor district, Wetzel County, the Grass Lick Oil and Gas Co. completed a test on the J. T. Lemasters farm in the Gordon sand. It is showing for a 4-bbl. producer. In Pleasants County, the first well completed in that district in some time, L. C. White and others drilled a test on the Edward Newland farm in Union district. It will make a 5-bbl. pumper.

Gas Wells

In Calhoun County, the Southern Oil Co. completed a test on the G. W. Maze farm in Sheridan district. It was drilled in the Injun sand and is showing for a fair gas well. In Lee district, the United Fuel Gas Co. completed its No. 3 on the Carr Shaffer farm in the Injun sand and has a gas well. In Clay County, Pleasants district, Godfrey L. Cabot drilled his No. 8 on the Hill-Long property to a depth of 2,239 feet and the Injun sand and it is showing for about 380,000 feet.

In Doddridge County, the Columbian Carbon Co. completed No. 60 on the Louis Maxwell farm in the Gordon sand and has a gas well. This well is in West Union district. In the same district, the Travis Brothers drilled a test on the S. S. Spencer farm in the Injun sand and have a fair gas well. In Fayette County, the Montgomery Gas Co. completed No. 9 on the New River Colliery Co. in Kanawha district. It is a dry hole to a depth of 2,503 feet.

In Harrison County, the Reserve Gas Co. completed a test on the Albert Shinn and others lease in Union Township, and has a very light gas well in the Speechley sand at a depth of 3,116 feet. In Kanawha County, the Winifrede Co. completed No. 12 on its own tract in Cabin Creek district. It was completed at a depth of 1,791 feet and is showing for 250,000 feet. In the same district, the Quincy Coal Co. completed two wells, No. 20 on its own property in the Salt sand and a fair gas well, and No. 37 on the Huntington Development Co. in the same sand and a gas well.

Lincoln County

In Lincoln County, the Allegheny Gas Corp. completed No. 4 on the Jack Stowers farm in Union district in the Berea sand and has a fair gas well. In Sheridan district, the Martin Gas Co. completed a test on the Eliza Bias Heirs farm in the Big Lime sand showing for a fair gasser. In Jefferson district, Black and Wilkerson are abandoning their test on the Delia Mullens farm after finding a poor sand.

In Marion County, Victor Tennant drilled his test on the H. O. Shackleford farm deeper to the Fifth sand at 2,926 feet. It is showing for about 400,000 feet and is in Paw Paw district. In Putnam County, the Henderson Gas Co. completed a gas well in the Berea sand on the Charles W. Nichols farm in Curry district.

There were three completions in Ritchie County. In Grant district, Morris and others drilled a test on the Gus Weekley farm in the Big Injun sand and found it dry. This well may be drilled deeper. In the same district, the Continental Oil Co. had a dry hole in its second well on the N. T. Mason farm. It was completed in the Berea sand. In Clay district, Fannie McCullough and others drilled a test on the Fannie McCullough farm and abandoned it after finding no pay sand.

In Wayne County, W. P. Floyd drilled a test on the J. H. and J. B. Start farm in Ceredo district to a depth of 2,689 feet and found insufficient gas at that level for a test. The well has not yet been shot and has been shut down for the present. In Wetzel County the Lemley Oil & Gas Co. drilled the old test on the E. Lemley heirs farm in Church district deeper to 3,200 feet and has a gas well from that depth.

Drilling in West Virginia

In Marshall County the Manufacturers Light & Heat Co. is drilling at 1,800 feet on the William and A. Archer farm in Cameron district, and moving in the tools on the W. H. Loper and others' lease. The same operator is building a rig on the Dora Doman and others' farm in Cameron district. In Liberty district this company has reached 1,725 feet in No. 2,994 on the P. and I. P. Chambers farm. In the same district, G. B. Patterson has reached 2,500 feet on the Mary Chase heirs farm, and the Valley Run Oil & Gas Co. is building a rig on the W. E. Patterson farm. In Sandhill district the rig of the Myers Oil Co. is still standing on the C. M. Strickland farm.

In Ritchie County, J. W. Deem and others have rigged up on the W. W. Lawrence farm in Grant district, and the Continental Oil Co. has made a location for a second well on the N. T. Mason farm. In the same district, C. R. Lamp and others are down to 1,930 feet in an old test well drilled deeper on the Ama Dotson farm, and the Cairo Oil Co. is in the sand in its No. 4 on the Phillip Deems heirs farm. H. E. Flanigan and others is at 1,300 feet on the G. B. Markey farm, and Edwin D. C. Lynch has plotted a location for No. 15 on the Cornelia Storrs farm. In Murphy district, Huffman and others are down to 1,850 feet and testing in No. 1 on the Emery Wilson farm, and C. B. Lewis and others have a rig standing on the W. P. Baker farm. G. L. Cabot has made a location on the J. N. Eddy farm.

In Gilmer County the Gilco Oil & Gas Co. is at 1,200 feet on the P. R. Woofter farm in Troy district. In Center district the Chartiers Oil Co. has a rig standing for No. 5 on the Daniel Huffman heirs farm. In DeKalb district the following work is noted: L. C. Waggoner is fishing for tools at 1,590 feet in his test on the A. L. Radabaugh farm. Clem Morris and others are drilling at 1,515 feet on the W. F. Roberts farm. Frank Golden and others have a rig standing on the H. E. Engle heirs farm. On the Alva J. Hardman farm, F. G. Davis and others have reached 1,200 feet. The Bowser Oil Co. is shut down with a bad hole in No. 2 on the John R. Ralston farm. The McCall Drilling Co. has rigged up on the W. A. Moore farm. The Hope Natural Gas Co. is rigging up to drill its old test on the W. V. Gainer farm deeper, and is drilling its old test on the W. G. Bennett farm deeper and reached 2,110 feet.

In Putnam County, J. V. Reishman is at 900 feet on the William Dent farm, Scott district, and the Celia Oil & Gas Co. has made a location for No. 5 on the John Tormey farm. In the same district the Sowders Oil & Gas Co. is in the sand in No. 3 on the Pines and Moore farm, and W. J. Peterman is drilling No. 3 on the R. L. Morris farm. H. C. Zogg has made a location for No. 3 on the Maddox heirs farm.

SOUTHWEST PENNSYLVANIA

There was an increase in the number of wells completed in southwest Pennsylvania but none of any size. In Allegheny County, Brooker & Co. completed a 1-bbl. pumper on the Guyer farm in McCandless Township and in the 100-foot sand.

In Greene County the following completions were reported. In Whitely Township the Manufacturers Light & Heat Co. drilled a test on the John Hudson farm to a depth of 3,224 feet and it was dry and abandoned. In the same section the People's Natural Gas Co. has a gas well at a depth of 893 feet and in the Dunkard sand on the F. B. Haines farm. This well will probably be tested in deeper sands. In Dunkard Township the Union Gasoline & Oil Co. has a gas well at a depth of 3,275 feet on the Nick Livengood farm. In the same township the Convex Glass Co. completed a gasser at a depth of 2,290 feet on the James Titus farm.

In Washington County, T. H. Ely farm, East Finley Township, the Union Gasoline & Oil Co. has a gasser reported in. In the same township, H. Furman and others are down to 2,100 feet in a well on the J. B. Montgomery heirs farm, and the Union Gasoline & Oil Co. is at 1,800 feet on the J. Montgomery farm.

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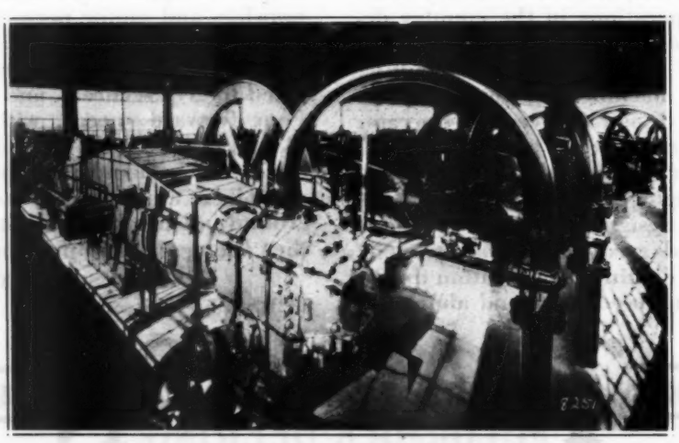
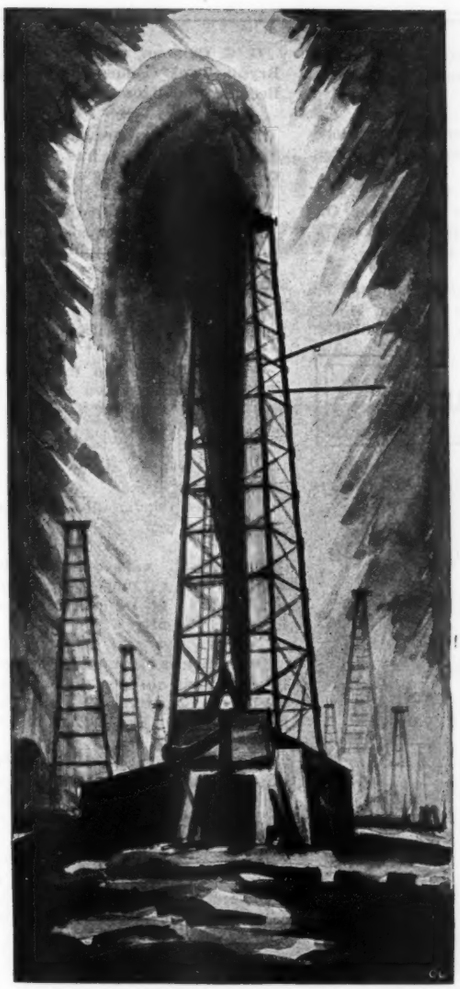


Cooper-Bessemer 1,000-horsepower compressors.

SURVEY SEEKS GEOLOGISTS

WASHINGTON, D. C., Mar. 9.—Associate geologists are desired by the Civil Service Commission to fill vacancies in the Geological Survey, one at a salary of $3,200 and the other at $2,600 a year.



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Personal Paragraphs About Oil Men

George R. McKinney, of Warren, Pa., now retired, has recently spent some time in San Antonio, Tex.

* * *

N. C. McGowen, president of the United Gas System, Houston, Tex., has returned to his office from a business trip East.

* * *

S. A. Millican, secretary, E. F. Simms interests, Houston, Tex., has been in Washington, D. C., on an extended business trip.

* * *

A. I. Sellars, field superintendent of the Skelly Oil Company, is recovering from an operation performed at a Tulsa hospital.

* * *

W. R. Steinett, vice president of the Seminole Oil Drilling Company, of Oklahoma City, Okla., recently visited the Alberta oil fields en route to Chicago.

* * *

Frank W. Kirk, general manager of the Houston Pipe Line Company, Houston, Tex., has been elected president of the South Texas Chamber of Commerce.

* * *

W. J. Sherman, chief clerk of the production department, South Texas division, Houston, has been confined to the hospital due to an operation for appendicitis.

* * *

W. H. Carr, of New York City, an executive of the Standard Oil Company of New Jersey, recently spent some time in San Antonio, Tex., and from there continued his trip to Old Mexico.

* * *

Harvey Hardison, chief production engineer, southern division, the California Company, was elected chairman of the Hobbs Engineering Committee at the last meeting of the advisory committee.

* * *

F. O. Prior, president; H. G. Schneider, director; and E. F. Bullard, director in charge of exploration, all of Tulsa, with the Stanolind Oil & Gas Company, have been making an inspection trip by plane in West Texas.

* * *

J. H. Jenkins, in charge of production for the Associated Oil Company, San Francisco, Calif., has been making an inspection trip in Texas, especially East Central Texas on his way back to the western coast from a trip East.

* * *

C. O. Maddox, of San Antonio, Tex., who has operated extensively in Southwest Texas, is opening headquarters in East Texas and will devote a considerable part of his time to that territory for the next several months at least.

* * *

Ralph Bishop, formerly of the Crystal Oil Refining Corporation, has left Shreveport, La., and is now affiliated with F. W. Burford in East Texas operations. Sid J. Russell has been promoted to the position of salesmanager which was vacated by Mr. Bishop.

* * *

Hudnall & Pirtle, consulting geologists of San Antonio, Tex., are now in East Texas where they are engaged in work that will extend over a period of the next four months. Chester Whorton, consulting geologist of San Antonio, is associated with them in the work.

* * *

M. R. Shaffer, general superintendent of oil production for the Empire Companies, returned to Bartlesville, Okla., recently from Kansas City, Mo., where he had been under medical treatment at Research Hospital for several weeks. His condition is said to be improved.

* * *

Messrs. Goll and Graves, of Goll, Graves & Meckling, of Saginaw, Mich., were Toledo, Ohio, visitors recently. The firm has drilled wells in the Mount Pleasant Field, Isabella County, Michigan, and in the Dundee Field of western Monroe County, also a test in Lenawee County, and is now drilling a wildcat in Gibson Township, Bay County, Michigan.

J. N. Gallagher, special representative of the oil division of George B. Limbert & Company, Chicago, Ill., is visiting Tulsa.

* * *

William Lang, of Lima, Ohio, head of the Globe Oil Company, operator in the Muskegon Field, was a Muskegon visitor recently.

* * *

C. E. Whitney, salesmanager of the Baker Oil Tools Company, Los Angeles, Calif., is making a trip through the Mid-Continent fields.

* * *

F. C. Sealey, assistant manager of production of The Texas Company, South Texas division, Houston, is recovering from an operation for appendicitis.

Men of the Industry

William C. Whaley

William C. Whaley, familiarly known as "Bill," was recently appointed general superintendent of the Barnsdall Oil Company by R. A. Broomfield, president, following the death of Fred A. Fortine, vice president and general superintendent.

Mr. Whaley was born in Santa Maria, Calif., in 1895, and the family moved to Bakersfield when he was about 5 years old. As a youngster he took an interest in the oil fields and later on when the family moved to Taft he found employment as a roustabout during high school vacations. After graduating from Taft High School he entered the University of Southern California and took up the study of law. He entered war service two years later.

The war over, Mr. Whaley's oil field experience carried him into Wyoming and Texas. During the following few years he worked as a rig builder, driller, rotary helper, cable tool driller and rotary driller. Shortly after he was married in 1921, he was employed by the British Union Oil Company for service in Barbados, West Indies. After two years of West Indies life he returned to the United States in 1923 and was employed by various contractors operating mainly on Signal Hill. He had experience under Mr. Fortine in the Coalinga fields and when Mr. Fortine was called to the Barnsdall company in 1924, Mr. Whaley was employed as one of the three drillers on Barnsdall's No. 1 Rosecrans. His activities have been centered mainly in the Los Angeles Basin fields during his connection with the Barnsdall company. He was made assistant general superintendent and this work brought him into contact with all California Barnsdall operating properties. Mr. and Mrs. Whaley have one son.

G. C. Calhoun, representative of Black, Sivalls & Bryson Tank Company, has been transferred from Beeville to Kilgore, Tex.

* * *

Roy Lindley, representative of the Happy Belting Company, Tulsa, has been transferred to Longview, East Central Texas.

* * *

F. H. Thrailkill, district manager for the Continental Supply Company, recently spent several days in the San Antonio, Tex., territory.

* * *

W. B. Hassett, president, Imperial Refineries, who has been traveling around considerably, is now located with general offices at Clayton, Mo.

* * *

Wallace Ralston, of the Sun Oil Company, San Angelo, Tex., has been transferred to East Texas with headquarters at the Sun company's district offices at Tyler.

* * *

Ed W. Bateman, discoveror of the Kilgore Field, Rusk County, Texas, and family have been making an extended trip in the East, staying in New York for a short time.

* * *

John North, sales representative of the Trimont Manufacturing Company in the Southwest, with headquarters at Dallas, Tex., called on the trade in Tulsa recently.

* * *

Monte Warner, independent operator, who recently underwent an operation at Mayo Brothers clinic at Rochester, Minn., is again in the harness and has joined the East Texas "play" at Longview.

* * *

R. W. Patteson and Mrs. Patteson announced the birth of Patsy Ann at the San Angelo, Tex., Hospital on February 24. Mr. Patteson is zone agent for the Gulf Production Company at Midland, Tex.

* * *

Harry W. Schuetz, of the Colona protector division of the Pittsburgh Screw & Bolt Company, Pittsburgh, Pa., was in Tulsa for a stay of several days after a visit to the East Texas and Oklahoma City fields.

* * *

W. H. Reed, who has served for some time as salesmanager for Lion Oil Refining Company, at El Dorado, Ark., is moving to Memphis, Tenn., as sales representative for the Lion company in Tennessee, Kentucky, Mississippi, Alabama and Florida.

* * *

Carl W. Wangerien, independent operator of Okmulgee, Okla., and former president of the Okmulgee Chamber of Commerce, is critically ill in San Antonio, Tex., where he has been spending the winter, suffering from a pulmonary ailment.

* * *

R. T. Haslam, research director of Standard Oil Development Company, and Dr. W. K. Lewis, head of the Research Laboratory of Applied Science, Massachusetts Institute of Technology, were among the visitors on the inspection tour made recently at the Baytown plant of Humble Oil & Refining Company.

* * *

C. C. Spicer, president of the Republic Petroleum Company; Charles Donlon, chairman of the board; S. C. Nottingham, secretary; E. B. Gordon, a director; and Clayton Severns, general superintendent of the company, of Los Angeles, Calif., have been making a tour of inspection through the Texas and New Mexico fields.

* * *

E. P. Hindes has recently been appointed chief geologist of Henry L. Doherty & Company, in New York, and as such will be the executive head of the geological and land departments of the New York office. He will have direct supervision over all business pertaining to geological and land activities which may be handled in this office. His duties will apply to both oil and gas operations. His department will accumulate general information on petroleum and natural gas geology, and geological areas throughout the entire United States.

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Natural Gas Industry Developments

WYOMING NATURAL GAS COMPETES IN NEBRASKA

By Special Correspondent

OMAHA, Neb., Mar. 9.— Competition between Texas natural gas companies and Wyoming gas producing concerns, with Nebraska and South Dakota, and possibly Minnesota, as the prize, seems to be looming.

The North Central Gas Co. of Casper, Wyo., has entered Nebraska with a big pipe line, has secured several franchises in western Nebraska, and has announced that it will build eastward and northward if it finds there is a demand for natural gas in those directions. That such demand exists is shown by the result of the vote on natural gas in Scottsbluff, Neb., where at a special election the proposition carried by more than 20 to 1.

In fact, Nebraska is wild over natural gas. The State produces not a pound of coal, not a gallon of oil, not a foot of gas, and mightly little wood. All its fuel must be brought in from other states, and when Texas offered natural gas in Nebraska, the towns simply fell over themselves to sign contracts. Three Texas companies have built pipe lines from the Panhandle fields into Nebraska and on into Iowa. One of these companies has announced it will build to St. Paul and Minneapolis.

But central and western Nebraska towns and cities have not been touched by the southern pipe lines. The Texas concerns have been so busy building towards Chicago and to the larger Iowa cities that they left central and western Nebraska for later development.

The North Central company of Wyoming is entering Nebraska via way of the North Platte Valley. Already it has a pipe line from Casper to Glenrock, Wyo. The new line which it is building will parallel this pipe and at Glenrock the two will combine into a pipe line with more than the combined capacity of the two lines and will then get into Nebraska, the first town served being Scottsbluff. This is in the center of the beet sugar district, and the six big sugar factories will be tremendous consumers of gas once it is piped to their furnaces.

The pipe line from Casper to Scottsbluff has already been contracted for, the price being approximately $5,000,000. Between Casper and the Nebraska state line, a number of towns will be served.

From Scottsbluff the pipe line will be extended down the Platte River Valley, one of the richest sections of Nebraska and one of the most thickly settled. From some point near Bridgeport, a pipe line to the north will branch, going to the important towns of Alliance and Chadron, and probably on to the great mining center of Deadwood in the Black Hills, where the mines and reduction plants are great fuel consumers.

Other points in South Dakota and Nebraska will be served if there is a demand for the Wyoming product, the North Central company has announced.

In the meantime the Continental Construction Co. has connected up its 24-inch line from Amarillo, on each side of the Missouri River, the crossing being 15 miles south of Omaha, and has let a contract for another 24-inch pipe to parallel the first line. In crossing the Missouri the 24-inch line was split into 10 smaller pipes which were laid on the bottom of the river. Near Hastings, Iowa, 25 miles east of the Missouri, the Continental has let a contract for a $750,000 booster pumping station, to be used on its Chicago line.

The Missouri Valley Gas Co. has completed its line from Amarillo as far as Sioux City, Iowa, serving Grand Island, Lincoln and Fremont, Neb., and cities between.

But between the cities served by the Texas companies in eastern and northern Nebraska, and the Wyoming gas fields, there is a 300-mile territory thickly settled. To the north of this territory are the Black Hills cities. All of this is anybody's territory and the Wyoming gas companies are intending to serve this territory if they can get the business.

KENTUCKY SALES CONTRACT

A contract calling for deliveries to the Kentucky-West Virginia Gas Co. of 2,000,000 feet of natural gas per day for the remainder of the winter and 5,000,000 feet daily next winter, has been entered into by Wayne United Gas Co., according to announcement made by H. E. Danner, vice president of Appalachian Gas Corp., the parent company. Gas is delivered to the customer's pipe line near West Liberty, Ky., for transmission to Louisville, Ky.

Wayne United Gas Co., which owns or controls gas rights in approximately 45,000 acres in West Virginia, Kentucky and Ohio also sells gas to Libby-Owens-Ford Glass Co. and Owens-Illinois Glass Co., under sales contract calling for 5,000,000 feet of natural gas for daily delivery to the glass companies' plants in Kanawha City, W. Va.

MISSOURI EXTENSIONS

The Cities Service Gas Co. has been granted natural gas franchises at Waverly and Blackburn, Mo., as well as Alma, Mo. Waverly is on the Missouri River, south of Carrollton, one of the new towns recently piped for gas. Alma and Blackburn are south of Waverly.

Waverly will be served from the Cities Service Gas Co.'s main line extension to Carrollton. Alma will be served from the extension going to Lexington and Blackburn from the extension to Marshall, Mo. The company also recently was granted permission to construct a gas distribution system at Emma, Mo., by the county courts of both Saline and Lafayette Counties. Emma is to be served from the main extension to Sweet Springs, Mo.

GROWTH OF MISSOURI BUSINESS

Development in the heating of homes with gas in Missouri is shown in a statewide survey completed by the Missouri Association of Public Utilities. More than 23,700 Missouri homes are now heated by gas. Five years ago, only a few scattered homes used gas-fired furnaces.

The survey shows a total of 396,674 gas customers in Missouri, of which 357,639 use gas ranges, and 227,539 use gas water heaters. The number of Missouri homes heated with gas is 23,747. A similar survey in October, 1929, showed 390,779 gas ranges, and 219,847 gas water heaters in use, and a total of 13,591 homes heated by gas. This shows an increase in 1930, over 1929, of 5,944 gas customers, 13,860 gas ranges, 7,692 water heaters, and 10,156 more homes heated by gas.

IRMA GAS PROJECT

CHATHAM, Ontario, Mar. 7.—David Credille and H. B. Armstrong of Wainwright, Alberta, have secured a franchise to supply natural gas to the village of Irma, east central Alberta. The Credille-Armstrong interests will develop gas production close to the village, and their No. 1 well will be drilled in LSD 9, Section 28-45-9w4, just west of Irma. Rotary equipment will be used. The project will involve a complete distributing system for the village but only a short transmission line. Work on these will be commenced as soon as adequate gas production is secured, and it is hoped to deliver gas to Irma by next fall.

REFUSE AMARILLO CUT

AMARILLO, Tex., Mar. 9.—Request by the city commission for another cut in Amarillo's gas rates has met refusal in the form of a letter from the Amarillo Gas Co., which claims a loss of more than $20,000 in 1930.

James A. Carroll, president of the company, expressed surprise over complaints about high gas bills. "This cannot be the case," he writes, "for equal amounts of gas used at the new rate is very substantially lower than the former rate." The present schedule went into effect October 28, 1929.

The president of the distributing company says 1930 business ended with a substantial red figure and closes his letter with the following paragraph:

"Our policy has always been to meet the wishes of the people of Amarillo just so far as possible and that disposition still exists, but you should bear in mind that utilities generally have been affected by hard times and the gas company is no exception."

O. N. G. POSTS BOND

Bond of $400,000 has been posted in federal court by the Oklahoma Natural Gas Corp., putting into effect the recent temporary injunction which the company obtained against a corporation commission order for a 10-cent reduction in gas rates, for February, March and April.

Pending outcome of the company's fight against the reduction order, previous rates will be charged, the $400,000 bond being posted to assure customers of rebates should the courts uphold the commission's order for reduced rates. Forty-seven cities and towns were affected by the reduction order.

No date has yet been fixed for hearing on the company's application for a permanent injunction.

GAS CONSERVATION CONFERENCE

CHATHAM, Ontario, Mar. 7.—J. E. Brownlee, premier of Alberta, has invited oil and gas operators from Turner Valley and other Alberta fields to confer with the provincial government at Edmonton in reference to a natural gas conservation policy. The government has for some time been considering legislation designed to curb the waste of natural gas, and is also drafting regulations governing the administration of oil and gas leases within the province. The proposed export of natural gas of Saskatchewan may also be discussed at the conference.

CALIFORNIA'S PRODUCTION

LOS ANGELES, Calif., Mar. 9.—Gas production in California in 1930 was 544,000,000,000 feet, Claude C. Brown, chief gas and electric engineer of the railroad commission, said in a report to the commission.

Distributing utilities used 141,000,000,000 feet, 182,000,000,000 feet was used for repressuring and storage and general plant operations, and 220,000,000,000 feet was "blown into the air and wasted."

Brown said conservation accomplishment included reduction in wastage from 26,000,000,000 feet in February, 1930, to 6,000,000,000 feet in January, 1931.

BUFFALO, OKLA., FRANCHISE

A franchise to supply Buffalo, Okla., with natural gas has been granted to the State Fuel Supply Co. of Oklahoma City. The company has let the contract for construction of a 4-inch supply line 10 miles long to connect the Sinclair well, southwest of this city, with the gas distribution system. The same company is also installing a distribution system at Laverne, which will also be connected to the Sinclair well.

A. B. MACBETH HEADS SOUTHERN FUEL CO.

A. B. Macbeth, president of the Southern California Gas Co., will be president and general manager of the newly organized Southern Fuel Co. The new company will bring an additional supply of 130,000,000 feet per day to Los Angeles and the metropolitan district, and will spend approximately $7,000,000 in transmission facilities during the coming year.

The engineering details and plans for this project have been developed by William Moeller, Jr., vice president in charge of natural gas production and transmission of the Southern California Gas Co., and A. F. Bridge, vice president of the Southern Counties Gas Co., who will act as assistants to the president. The engineering committee for this project is composed of Mr. Moeller, Mr. Bridge and H. A. Barre and E. Davis of the Southern California Edison Co.

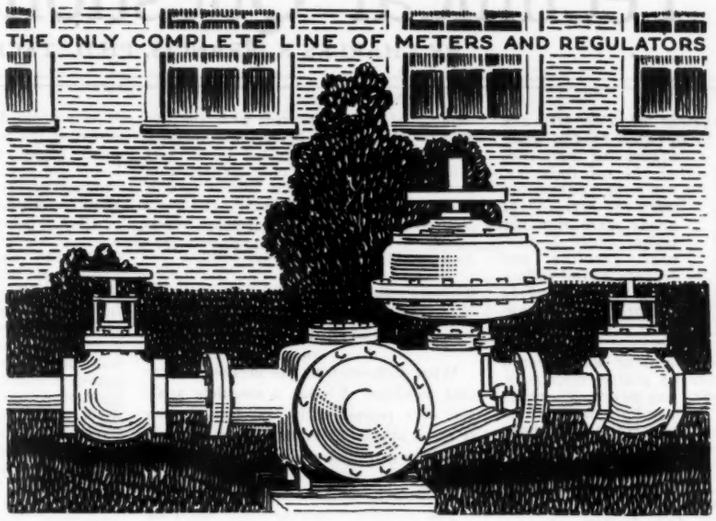
The new line will be approximately 210 miles in length and probably 26 inches in diameter. The actual construction will be under the direct supervision of H. P. George, general superintendent natural gas production and transmission, who will be chief engineer of the new company, and B. M. Laulhere, division superintendent of the Basin division, who will be an assistant to Mr. George.

The stock in the new company is jointly held by the Pacific Lighting Corp. and the Southern California Edison Co. The headquarters of the new company have been located at 740 South Broadway, Los Angeles, and the directors and officers chosen from the personnel of the two companies. The president will have on his staff F. B. Lewis of the South California Edison Co. as vice president and assistant general manager, and Franklin S. Wade of the Southern Counties Gas Co. as vice president, and D. M. Trott of the Edison company as secretary and treasurer. On the board of directors are R. H. Ballard, president of the Southern California Edison Co.; Addison B. Day, president of the Los Angeles Gas & Electric Corp.; Alexander B. Macbeth, president of the Southern California Gas Co.; Franklin S. Wade, president of the Southern Counties Gas Co.; LeRoy M. Edwards, president of the Industrial Fuel Co., and W. C. Mullendore, F. B. Lewis and G. C. Ward of the Edison company.

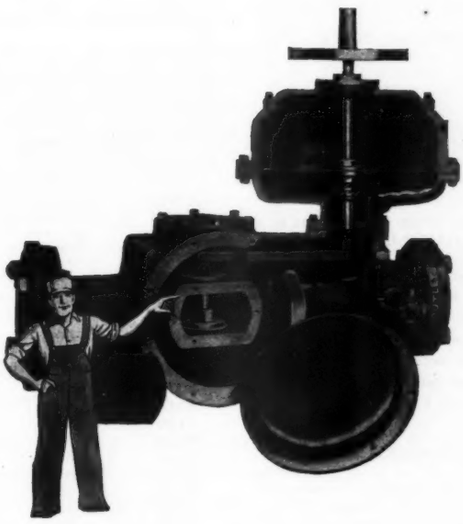
The line, on which actual construction is to start in April, will handle an amount equal to approximately one-third of the gas now delivered in the Los Angeles metropolitan area. The additional supply from the new line, whose southern terminus will be in Long Beach, will meet the growing demand in southern California and furnish fuel to the Southern California Edison Co.'s Long Beach plant.

The increased supply of natural gas will be particularly welcome because of the diminishing gas supply of the oil fields in the Los Angeles Basin. The plans being made are taking into consideration the many problems that are bound to arise as the new line progresses through the rough and rugged Techachapi Mountains and the congested Los Angeles district.

Several members of the Southern California Gas Co.'s personnel will be on a leave of absence in order to work with the new organization. Besides Mr. George and Mr. Laulhere, K. A. Wilbur, J. B. Reddick, William Pipkin and Frank Bryant will temporarily leave the Southern's ranks to assist in construction work with the Southern Fuel Co.



FOR LOW PRESSURE REGULATION -EMCOS



"Supersensitive"—the tribute payed by gas engineers to the EMCO low pressure regulator. Long sensitive diaphragm stroke, relatively short valve stroke, permits large diaphragm area responsible for high degree of accuracy. Diaphragm type seal used in diaphragm stem—eliminates friction, pumping and chattering.

Of course the Removable valve box; One piece body casting; Interchangeability of parts; are found in EMCO low pressure regulators.

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Technical Questions Answered

BY CHARLES K. FRANCIS, PH.D., TECHNICAL EDITOR

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible so as to assure a satisfactory answer.

All inquiries should be signed and if other than the given initials are to be used please indicate the desired letters.

Questions involving patented processes, intricate formulas and calculations and estimates of costs, for obvious reasons, cannot be answered. The replies will appear on this page within a reasonable time.

THEORY VAPOR PHASE TREATING

Would you kindly explain what is the theory covering the treating of gasoline in the vapor phase with fuller's earth?—A. D. W.

The theory of the process for treating in the vapor phase is given in the original article by Gray and Mendelbaum, Ind, and Eng. Chem. 16, 913, 1924, as quoted: "The process described . . . is based on the polymerizing action of adsorbent materials, which, while much weaker than sulphuric acid, is yet strong enough to cause the polymerization of the highly unstable substances which give cracked distillates their undesirable properties. It is carried out in the vapor phase. This not only makes it possible to combine the operation with a fractionation, but has the added advantage of utilizing the heat of the vapors to maintain a temperature which allows the convenient separation of the polymerized substances by virtue of their increasing boiling point. Finally, it has been found that the effect of the catalyst on the substance involved is markedly different in the vapor phase from that in the liquid phase. The latter was studied, in the case of emylene and pinene, by Gurwitsch, and for pinene and terpenes by Venable, who found that lively exothermic reactions occurred in each case, even at room temperature, resulting for amylene, in the formation of as much as 85 per cent of a higher boiling substance; for the terpene, in rearrangement and some polymerization. The study of the vapor phase reactions of these and other substances is not yet complete, but the indications are that, although the results ar qualitatively the same, they are different in degree. Thus, in the case of amylene, it was found that by slowly distilling some of this substance through fuller's earth kept at 100° C. only 5 per cent of a higher boiling substance was obtained from the distillate, compared with the much larger amounts in the liquid phase reported by Gurwitsch. On the other hand, dimethylbutadiene reacts very vigorously with fuller's earth in the vapor phase. When a dilute solution of dimethylbutadiene in a mixture of chloroform, benzene and toluene was distilled and the vapors were passed through fuller's earth, the distillate had an iodine number of 2.8, compared with that of 16.5 for the charge. From these observations the inference has been drawn that fuller's earth has only mild polymerizing action on the vapors of olefins and a violent one on those of diolefins."

A recent article on vapor-phase treating is to be found in The Oil and Gas Journal, March 5, 1931, page 140.

HYDROCARBONS IN NATURAL GASOLINE AND DEFINITION FOR NATURAL GASOLINE

What hydrocarbons are present in natural gasoline? I want a complete analysis of a representative gasoline if such is to be obtained. Is there any accepted scientific definition for natural gasoline?—G. H. R.

The analyses following are: No. 1 by Podbielniak, The Oil and Gas Journal, October 10, 1929; No. 2 by Anderson and Erskine, Ind. Eng. Chem., 16, 263, 1924, representing a Pennsylvania product; No. 3 by Garner, Gruse—Petroleum and Its Products, page 19, representing a gasoline from West Virginia.

Hydrocarbons in Natural Gasoline

Sample—	1	2	3
Propane	3.31	..	trace
Butanes	26.52	*20	20
I-Pentane	9.59	13	....
N-Pentane	17.11	17	*32/35
I-Hexane	7.63	9	....
N-Hexane	13.10	15	....
I-Heptane	6.41	8	*30
N-Heptane	12.10	12	12/15
Octane	...	4	3/5
Residue	4.24	..	....

*Includes the preceding.

These analyses show the product known as natural gasoline to have a composition that is reasonably uniform, although made at widely separated places. Sample No. 1 is understood to have been made from Oklahoma gas, and the propane content calls attention to the chief difference in natural gasolines; that is in the more volatile portion. A fully stabilized natural gasoline should contain no more than a trace of propane.

Concerning the scientific definition of natural gasoline, Martin Shepherd, United States Bureau of Standards, has stated in The Oil and Gas Journal, June 27, 1929, page 48:

"Strangely enough, this usually simple requirement has presented a most perplexing problem in the present instance, for entire agreement has never been reached in the natural gas industry as to just what is meant by the term 'natural gasoline.' It is generally agreed that natural gasoline consists of a mixture of hydrocarbons which may be condensed from natural gas and that when necessary this condensate should be commercially manageable and capable of safe transportation. But just what the exact chemical composition of this condensate may be is a question which cannot be answered. Because of the different character of the gas from various fields, and because of the difference in local requirements of refiners, what is considered 'natural gasoline' in Pennsylvania may not be 'natural gasoline' in Texas, and a California or Wyoming 'natural gasoline' may not be recognized as such in either of the first two localities. . . . A perfectly respectable 'natural gasoline' born of the winter months might find its reputation for sobriety entirely reversed during the hot days of summer. So it is that geographical and meteorological conditions conspire to confuse the identity of the substance which we must determine by analysis without knowing just what it is we are to determine. With this troublesome situation as a beginning, it may seem difficult to develop a definition of the term 'natural gasoline' content. However, a workable definition based on the two factors of chemical composition and vapor pressure seems possible and desirable."

After concluding that a definite product will be obtained from a natural gas of definite composition under fixed conditions of temperature and pressure, Shepherd offers his definition: "Accepting this concept as a reasonable basis of identification we may then define the natural gasoline content as the hydrocarbon condensate derived from natural gas which is composed of the total percentages of pentane plus higher boiling hydrocarbons occurring as vapors in the natural gas, plus a sufficient percentage of normal butane to cause the total condensate to possess a specified saturation pressure at a specified temperature."

The Natural Gasoline Association has announced the specification below for commercial purposes: "Natural gasoline is a liquid petroleum product consisting of the heavy hydrocarbons extracted from natural gas by such means as compression, absorption and other processes. Natural gasoline is defined further for commercial purposes by the following specification:

"Vapor pressure—10/34 pounds per square inch absolute at 100° F. (Reid).

"Evaporated at 140° F.—25/85 per cent.

"Evaporated at 275° F.—Not less than 90 per cent.

"Endpoint—Not above 375° F.

"Corrosion—Noncorrosive.

"Doctor test—Negative sweet.

"Color—Not under 25 Saybolt."

There are a number of grades of natural gasoline recognized by the association. These are classified according to percentage evaporated at 140° F. and the vapor pressure at 100° F.

BLENDING FOR ANTIKNOCK GASOLINE

Some particular crudes yield gasolines which are bad knocking fuels, others produce extremely high antiknock products. Will a blend of such gasolines produce a high quality antiknock motor fuel or is the antiknock quality liable to be lost in the blend?—J. L. W.

We do not know of any knocking gasoline which when blended with an antiknock gasoline will act as a neutralizing agent toward the antiknock properties. The tendency is usually simple dilution. The practice of improving a low value gasoline by the addition of an antiknock stock is the common practice in refineries. The antiknock product may be derived from a selected crude oil or it may result from a special method of manufacture, such as vapor phase cracking.

The hydrogenation process promises to furnish large quantities of superior antiknock stock for improving motor gasoline. A British patent, No. 12,733, issued 1929 for the I. G. Farbenindustrie Akt. Ges., specifies a motor fuel of high antiknock value by blending with the products of the hydrogenation of coal. An addition of 10/20 per cent of the hydrogenated product is sufficient to eliminate knocking, the fraction boiling between 266° F. and 356° F. being especially suitable. It is mentioned that the better known knock inhibitors may be added; these include tetraethyl lead, iron carbonyl, benzol, methyl or ethyl alcohol, methylamine, and aniline.

Several examples of this blending are given in the patent: Mid-Continent straightrun gasoline, gravity 59.7 A.P.I., boiling up to 356° F. is blended with 20 per cent of a fraction boiling up to 392° F. obtained by hydrogenation of a tar fraction from coal; the mixture not knocking at a compression ratio of 5 : 1. A Pennsylvania straightrun gasoline is mixed with 20 per cent of benzol and 20 per cent of an hydrogenation product boiling up to 392° F. A gasoline from Ranger (Texas) crude oil is blended with 30 per cent of a gasoline distilling between 212° and 392° F., from the hydrogenation of coal, together with 25 per cent natural gasoline. A blend containing 75 parts of Ranger gasoline, boiling between 113° F. and 311° F., and 25 parts gasoline boiling from 293° to 388° F., obtained from the hydrogenation of mineral coal. A gasoline of distilling range 185° to 392° F., from the hydrogenation of coal pitch, is mixed with 30 per cent of natural gasoline.

ACTUAL ALKALI IN CAUSTIC SODA

Could you give me the formula for converting the alkali content of caustic soda to N. Y. & L. percentage? Is the N. Y. & L. value generally recognized as truly representing the strength of caustic soda?—F. G.

The strength of sodium hydroxide, caustic soda, is occasionally stated in terms of the N. Y. & L. test, which indicates an alkali content about 2.5 per cent too high. This was caused by an error in the use of the atomic weight of sodium. Fortunately the practice of using this term is rapidly decreasing and now all reputable dealers specify actual alkali when referring to the strength of caustic soda.

The table following shows the relative values of caustic soda of a definite sodium hydroxide content when converted to actual alkali and the N. Y. & L. test.

Alkali in Caustic Soda

Caustic soda sodium hydroxide NaOH per cent	Actual alkali sodium oxide Na_2O per cent	N. Y. & L. sodium oxide Na_2O per cent
74.83	58.0	59.87
75.48	58.5	60.38
76.12	59.0	60.90
76.77	59.5	61.42
77.40	60.0	61.93
78.05	60.5	62.45
78.70	61.0	62.97
79.35	61.5	63.48
80.00	62.0	64.00
80.65	62.5	64.52
81.29	63.0	65.03
81.94	63.5	65.55
82.58	64.0	66.06
83.23	64.5	66.58
83.87	65.0	67.10
84.52	65.5	67.61
85.16	66.0	68.13
85.81	66.5	68.65
86.45	67.0	69.16
87.10	67.5	69.68
87.74	68.0	70.19
88.39	68.5	70.71
89.03	69.0	71.23
89.67	69.5	71.74
90.30	70.0	72.26
90.95	70.5	72.77
91.60	71.0	73.29
92.25	71.5	73.81
92.90	72.0	74.32
93.55	72.5	74.84
94.19	73.0	75.35
94.84	73.5	75.87
95.48	74.0	76.39
96.13	74.5	76.90
96.77	75.0	77.42
97.32	75.5	77.94
98.06	76.0	78.45
98.71	76.5	78.97
99.35	77.0	79.49
100.00	77.5	80.00

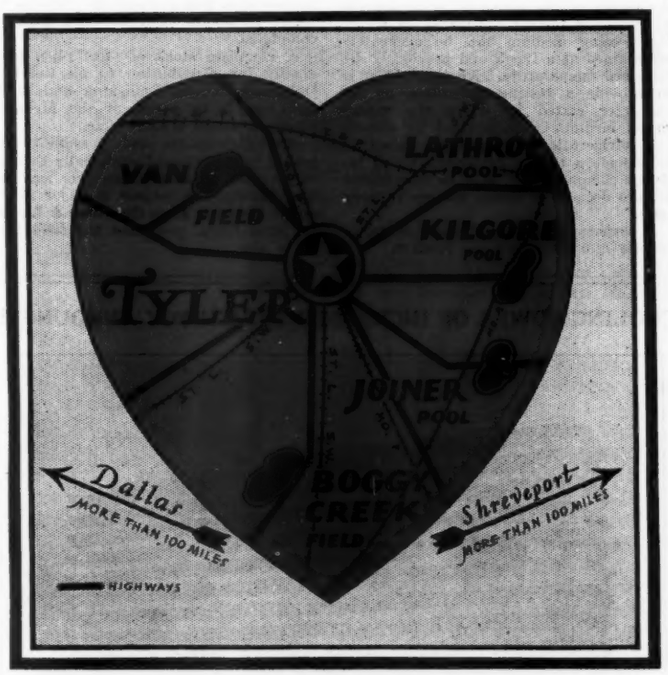
When the analysis of a sample of caustic soda is expressed in percentage of actual alkali (Na_2O), based on standard atomic weights, if the figure is multiplied by 1.03226 the result will represent N. Y. & L. per cent.

The Capital of East Texas' New Empire of Oil . . . is TYLER

When you come to East Texas — make *Tyler* your home and headquarters. To business firms that need offices in close contact with the oil fields; to companies seeking the best qualified distributing point for merchandise and equipment; to organizers of new industries and heads of old ones; to investors, builders, Tyler is today's City of Opportunity.

Tyler is East Texas' banking center, railroad center, highway center — has been for years. It is the largest city between Dallas and Shreveport, each more than 100 miles away.

Seven paved State Highways radiate from Tyler. Railroads give rapid freight and passenger service in five directions, with ample freight yards and loading and storage facilities.



The Lathrop Pool is 35 miles from Tyler; Kilgore 26 miles; Joiner 28 miles; Boggy Creek 28 miles; and Van 26 miles, on highways radiating from Tyler like the spokes of a wheel.

Come to Tyler! Our new citizens are finding beautiful surroundings and delightful social life. We are building a large addition to a hotel that's already the finest in East Texas. . . We have just spent $325,000 making good schools even better. . . Another $195,000 for sewer improvements. . . We have enough pure water for a city twice our size . . an abundance of natural gas . . unexcelled electric service. . . Unsurpassed public school facilities. . . The Best Lighted City in East Texas. . . . Tyler is *alive!*

A $350,000 refinery with an 8-inch pipe line to the Kilgore Field is under construction. . . So are scores of apartments and homes. . . Building permits in 1930 exceeded $875,000... A new Federal Building, anticipating the needs of the next 20 years, has been approved at Washington. . . *Never did a city offer greater opportunities to the permanent investor.*

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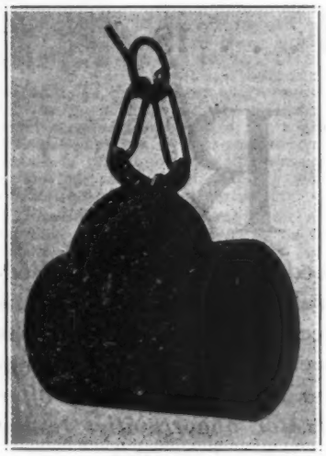
WITH TENSION RELIEVED TONGS DROP THEIR LOAD

The Allsteel Products Manufacturing Co. of Wichita, Kans., announces the new Cardwell automatic-release pipe tongs which are of unique design and embody many advantageous features among



which automatically release the load when the tension on the lifting line is relieved. This speeds the lowering-in operation as it is unnecessary to have a man in the trench to "fight the hooks loose" from the pipe. It eliminates the use of any kind of "slings" or "bellies" which have to be removed from the pipe after it has been lowered-in. There is no tearing of pipe covering or marring of coating.

Overall dimensions are the same in either open or closed positions. This also facilitates the lowering-in operation as the tongs freely come out of the ditch without being turned. The tongs may be dropped into the trench to lift the pipe without "bell-holing" the ditch walls, or digging under the pipe, when necessary to remove pipe after it has been lowered-in.

The tongs grip without slipping. They are so constructed that the "palms" of the gripping surfaces take hold positively and do not slip as they "bite." This prevents damage to pipe coating or covering. The gripping surfaces are large. The large, rectangular "palms" with their positive, nonslipping grip tend to insure against damage to pipe, covering or coating, to balance the load and better provide faster handling.

All-steel construction insures strength and a large safety factor with minimum weight. When relining is necessary it can be done in the field with ordinary hand tools.

CONVENIENT SEARCHLIGHT

The Delta Electric Co., Marion, Ind., announces a new Delta Hotshot searchlight attachment, ready to attach to any Hotshot type of 6-volt battery. This is a sturdy, handy lamp, built to meet the exacting requirements and rough handling this sort of lamp usually receives. It is easy to carry, with a handle molded to fit the hand. The reflector, made of corrosion-resisting nickel aluminum alloy, is 4½ inches in diameter. All other parts are cadmium plated, rustproof. The lamp throws a bright beam of light hundreds of feet. The reflector head may be turned in any direction, including straight up. The lamp is recommended for oil field workers, contractors, night watchmen, etc.

INVENTION DESIGNED TO TEST GASOLINE CONTENT

Invention of a device which is expected to effect important savings in operation of oil laboratories is announced by William M. Patch of 918 Stock Exchange Building, Los Angeles. The device is designed to replace the cracked ice method used for tests of hydrocarbons to determine their gasoline content. The inventor is Jess E. Crowe, of Long Beach, Calif. Associated with Mr. Patch and Mr. Crowe is Charles Greenberg, attorney. The appliances will be on the market soon, it is reported. Application has been made for patents.

Crowe Laboratory Refrigeration is the name chosen.

The patent application states:

"This invention relates to a petroleum testing apparatus whereby hydrocarbons are tested as to their gasoline contents. An object of the invention is to provide a petroleum testing apparatus in which the cooling medium can be accurately maintained at a fixed, and previously determined temperature. Another object is to provide a testing apparatus of the character stated in which the vapor-cooled medium is maintained by electrical refrigeration. A further object is to provide a testing apparatus which includes chambers that may be maintained at zero degrees or lower, for use in pour tests."

A corporation is being formed to manufacture and distribute the product.

NATIONAL TUBE TO HAVE HUGE MEMPHIS TERMINAL

The National Tube Co., subsidiary of the United States Steel Corp., is about to begin construction of one of the largest river-rail terminals on inland waterways at Memphis, Tenn., on a 10-acre site with a large frontage on the Mississippi River.

This company is the fifth leading producer of steel pipe from the Pittsburgh area which has chosen Memphis as a gateway for the distribution of that commodity by rail to points in the South and Southwest, the others being the Jones & Laughlin Steel Corp., Spang, Chalfant & Co., the Wheeling Steel Corp. and the Youngstown Sheet & Tube Co.

Distribution through the new terminal will not await its completion, however, but will start at an early date when steel pipe manufactured in the plants in the Pittsburgh area will be received in barges. The storage and distribution of the material will be cared for through existing terminals until the new plant is completed.

A complete stock of steel pipe, principally for distribution to oil fields in Oklahoma, Texas, Louisiana and South Arkansas is to arrive at the Memphis terminal within a short time.

Steel distribution made possible by improved waterways and principally through the completion of the Ohio river lock and dam system, has become a major industry in Memphis since the Jones & Laughlin Steel Corp. pioneered the field nine years ago.

GASO HAS AN ADDITION TO ITS LINE OF PUMPS

A new addition to the Gaso line of pumps is the Gaso Figure 1931 enclosed-type Timken bearing suction pump, which has an 18-inch stroke and a fluid end taking interchangeable liners from 6 to 10-inch. Among the features designed

to make this pump economical in operation are Timken tapered roller main and pinion bearings, sealed off from the crankcase. The connecting-rod crank end bearing is equipped with removable steel shell, babbitt lined. The gear is semisteel and the pinion gear is forged steel, both of wide face, stub tooth construction, running in oil. The valves are of monel metal, of light construction, with bronze seats. The frame is of sufficient length to avoid overlap of piston rods.

This new pump can be arranged for top-mounted motor drive, as shown, or for any other type of drive desired. Detailed information can be obtained from the Gaso Pump & Burner Manufacturing Co., Tulsa.

SUN COMPANY BUILDING TANKER WITHOUT RIVETS

The Sun Shipbuilding Corp., Chester, Pa., is building for the Atlantic Refining Co. the first steel-hulled ship of any kind made in the United States without the use of pneumatic hammers and rivets. The all-welded hull, though an innovation in this country, is not an experiment. German naval vessels have been made in this way since the war, with the advantage of lighter weight for a given capacity.

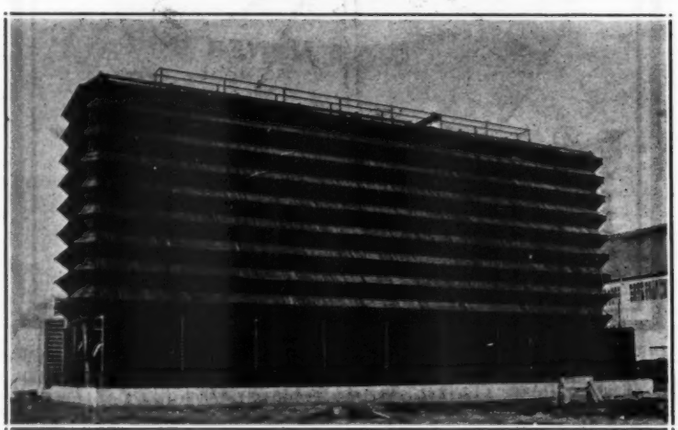
The new boat is to be a Diesel-electric tanker 200 feet in length, with a beam of 34 feet and a molded depth of 12 feet. It will have a main power plant consisting of three 150-horsepower Cooper-Bessemer Diesel engines driving three electric generators. These three generators will operate on a main propulsion motor of 400 horsepower.

The vessel will be the thirteenth of her type in this country, though her predecessors were built with conventional riveted hulls. The triple motors and generators are so arranged that any two may be used while the ship is under way and the third may remain idle for reserve power or for overhauling, should occasion arise. The tanker will have a capacity of 7,000 bbls.

MEASURES VISCOSITY OF OIL

An instantaneous electric viscometer for rapid measurement of the viscosity of finishing materials has been developed by the DeVilbiss Co., Toledo, Ohio, manufacturer of spray-painting, spray-finishing and air-compressing equipment. This device indicates viscosity of oils, paints, varnishes, lacquers, etc., in visual scale units just as the ammeter on the dash of an automobile indicates the rate at which the battery is being charged. The viscometer measures viscosity by rotating an impeller immersed in the liquid under standard electrical conditions. It shows liquid consistency as a dial reading. The effect of the viscosity load imposed by the liquid upon the impeller is determined by the effect upon the electrical circuit of the rotor driving the impeller.

COOLING TOWER OF INCREASED EFFICIENCY ANNOUNCED



A new spray deck cooling tower of improved cooling efficiency and decreased cost of operation has been placed on the market by the Marley Co. of Kansas City, Mo. This new tower has three improvements: First, the perfected Marley spray system in the top which provides maximum water distribution and break-up; second, a deck arrangement and spacing whereby all water is arrested and splashed at every deck; third, and most important, a new louvred louvre system which controls and increases air circulation throughout the tower, eliminates excessive moisture entrainment and reduces drift loss to a minimum.

The new Marley louvre system involves the use of two separate sets of louvres. The first or primary louvres are solid, being inclined outward and upward, away from the tower. The secondary louvres are placed essentially at right angles to the primary louvres and extend across the entire space between them.

The primary louvres are placed adjacent to each deck for effectively caring for the splash or rebound created by water impacting against the decks. They lean outward and away from the tower, permitting air flow horizontally and to all parts of the tower with only slight change of direction. The width of the opening between primary louvres is nearly doubled. The secondary louvres are spaced to give just the right added draft resistance to compensate for opening up the primary louvres, at the same time effectively forcing air equally to all parts of the tower. Air cannot lane or stratify at any point.

The result of these improvements in tower construction is an increased cooling efficiency that reduces pumping costs, tower height, wind stress and total weight. The Marley Co. has published a new catalog, No. 30, giving complete details of the new tower.

The Duriron Co., Inc., Dayton, Ohio, has established a branch office in the General Motors Building, Detroit, Mich., in charge of R. R. Rourke.

Let's Get Back to Bearing Fundamentals

A series of advertisements reviewing modern necessities in anti-friction bearing performance.

Tapered Roller TIMKEN BEARING EQUIPPED

No. 5

Anti-Friction Bearings Should Be Wear-Proof

Resistance to wear is a very important and necessary attribute of modern anti-friction bearings because it not only promotes long bearing life, but assures protection for precision as well.

In many types of modern machines, accuracy of operation may be adversely affected by bearing wear as slight as one-half of one ten-thousandth of an inch, hence the necessity of preventing it.

Timken Bearings owe their greater wear resistance and longer life to the following inherent and exclusive features of design and manufacture.

1. Timken tapered construction, which enables them to carry radial loads, thrust loads or both together in any combination.

2. Greater load area, the loads being distributed over the entire lengths of the tapered rolls, cup and cone.

3. Special analysis Timken-made alloy steel.

4. Case hardening of all parts, producing glass-hard contact surfaces with a tough inner core.

5. Extreme precision of manufacture.

6. Practically 100% frictionless performance.

Even after hundreds of millions of revolutions, the wear in a Timken Bearing is so slight as to be almost imperceptible even when measured by delicate instruments. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN *Tapered Roller* **BEARINGS**

Oil Industry Equipment and Supplies

HARD CONDITIONS MET BY SCREW LIFT VALVE

The screw lift valve is the result of an effort to give engineers a plug-type valve that more nearly meets the increasing severity of operating conditions in the field of power generation and in the process industries, such as petroleum refining, and in the control and transportation of crude oil and natural gas at and from the wells.

The plug valve's claim to industrial recognition is based on its long life and efficiency in handling fluids moving at high velocity, especially if those fluids contain solid matter in suspension, and its ability to withstand high pressures. In the high velocity of fluid transportation, head loss due to eddy currents has been effectively eliminated by the plug valve, as has rapid deterioration of valve seat and disc in globe and gate valves. The transported fluid does not make any sharp change in direction nor does it pass between seat and plug.

Operating experience with the plug-type valve has emphasized the specific need for: (1) Simplicity and dependability in the mechanism for seating and unseating the plug. (2) Strength and toughness and wearing qualities of valve body and plug at both atmospheric and elevated temperatures. (3) Less creep and grain growth of body and plug metal due to operation in the upper temperature range. (4) Positive and constant accuracy in plug alignment. (5) Resistance of wetted surfaces to corrosive action of oxidizing fluids. (6) Accessibility of packing gland and extra stuffing-box depth. (7) Removal of the valve-operating mechanism as far as practicable from wetted surfaces in service where temperatures are high. (8) Provision for rapid radiation of heat between wetted surfaces and operating mechanism. (9) Protection of elements of operating mechanism against contact with grit, moisture and oxidizing agents.

The engineering of the screw lift valve had as its objective the practical meeting of these requirements. Going back to the first principles of mechanics, the simple screw was utilized as a means of simplifying and facilitating the vertical movement of the plug. Regardless of pressure, temperature or long inoperative periods, the screw always raises the plug or seats it without the necessity of undue force or of setting up detrimental stresses in the operating mechanism.

The method of grinding each plug into its own seat, together with the care taken to get perfect plug alignment and the way in which the plug is seated in ordinary operation, effects a perfect closure without the need of an auxiliary sealing medium. The full significance of this feature is realized only when the breakdown temperature of the lubricant is considered.

The use of metal of superior physical qualities gives the screw lift valve a large margin of excess strength, toughness and wearability. It has reduced grain growth under recurring cycles of heating and has increased resistance to corrosion from water, salt water and sulphur compounds. The materials used consist of iron made under the Meehanite process, alloy steels and chromium-coated parts. Regardless of fluid pressure, plug alignment is fixed. This, in connection with the manner in which the valve is operated, makes for minimum wear between plug and seat, long operating life and resistance to leakage.

In operation the plug is lifted by turning the valve elevating nut in the direction indicated by the arrow cast in its surface; a moderate pull with an ordinary spanner wrench suffices. Provision is made in the construction of the screw lift valve to prevent the upward movement of the plug being carried far enough to cause it to jam in that position. A visible automatic stop restricts this rotation at a predetermined point. The plug is raised just enough to hold the complementary surfaces of plug and seat out of contact. In this position and only in this position may the plug be rotated (either opening the valve or closing it). Thus there can be no wear of either plug or seat resulting from a rubbing action between their surfaces.

The simple, nonbinding type of gland is used, operated by means of separate hex head gland bolts. It is unnecessary to dismantle even part of the screw lift valve in order to get at the packing gland.

The moving parts of this assembly are given effective protection against the ingress of foreign matter and moisture by means of a grease film terminating in a grease seal just under the lower lip of the plug elevating nut and at the upper stem bearing.

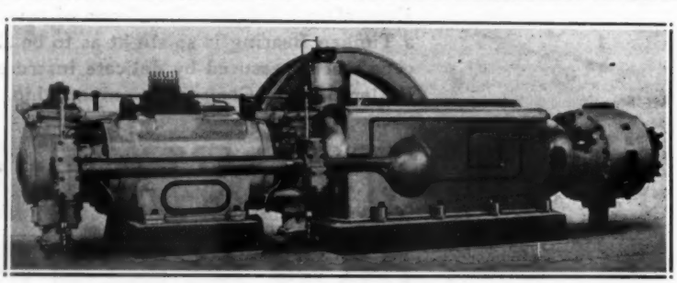
WICKWIRE SPENCER SALES CORP. IN ITS NEW QUARTERS

The Wickwire Spencer Sales Corp., subsidiary of the Wickwire Spencer Steel Co., has moved its southwestern sales office into the new building at 314 East Archer Street, Tulsa, which was constructed in accordance with the company's plans. It has a large warehouse, with offices on the second floor.

TWO NEW ARMCO DEPARTMENTS

The American Rolling Mill Co., Middletown, Ohio, has organized two new departments, a pipe manufacturing department and a spiral welded pipe department (sales division). C. C. Clarke has been made superintendent of the pipe manufacturing department in the Middletown division of the company. In addition to spiral welded pipe this department will make certain other factory products. Armco's activities in the pipe field will be under the direction of the spiral welded pipe department, which has been established as a separate department of the sales division. R. C. Beam has been made manager of this department, with H. M. Ives assisting him. The spiral-welded pipe is lighter in weight, is easier to handle and is manufactured in long sections of 40 feet, reducing the number of field joints.

COMPACTNESS ACHIEVED IN COOPER-BESSEMER ENGINE



The new Type 40 four-cycle compressor unit announced by the Cooper-Bessemer Corp., Mount Vernon, Ohio, has achieved compactness in its design. It delivers 400 brake horsepower in about the same space usually required for 200 brake horsepower.

Reports on installations of these new twin units indicate that operators approve of the unusually low build and other features of design which make all moving parts remarkably accessible. Adjustments can be made quickly and replacements are easy. The reduced size and special materials used tend to lower the costs of installation and upkeep. Information on specifications and performance may be obtained from the builders. The single-cylinder unit is rated 200 brake horsepower.

CAN INSTALL SAMPLER WITH OIL LINE IN USE

The operation of the Keys-Hoag line sampler, made by the Key Boiler Equipment Co., East St. Louis, Ill., is dependent upon the slow rotation of a specially designed cam and two differently linked arms, so connected to the valve stem on the sampling line that a spurt sample is obtained at equal intervals, the valve remaining open for a predetermined space of time. Due to the differential linkage when both arms are raised by the cam in unison, there is no movement of the valve stem. As there is a slight difference in the position of the points of the two arms which rest upon the cam, the outer lever will drop off the point of the cam prior to the inner lever. This causes the valve to be opened, and when the inner lever drops, the valve is instantly closed.

Advantages of the sampler are enumerated by the manufacturer: (1) Takes a positive squirt sample at regular intervals. (2) Valve is open wide during sample taking, insuring passage of oil through relatively large opening with little possibility of plugging with emulsion or foreign matter. (3) Can be installed on oil line while same is in use. (4) One standard size sampler can be used on any size of oil line. (5) Can be installed at any point convenient to electric service. (6) Can be used for sampling any fluid, oil or gas. (7) Can be quickly adjusted so as to give a definite quantity of sample for a given period on any particular type of oil handled. (8) At uniform pipe line pumping rates, the quantity of sample drawn is directly proportional to the pressure and inversely proportional to the viscosity, thereby for practical purposes compensating for increased line pressures or flow. (9) The sampler is of simple and rugged construction and can be installed by any mechanic who can use a drill and tap or corporation tap. (10) Sampler can be repaired while oil line is in use, thereby eliminating the necessity for expensive fittings and valves for by-pass arrangement. (11) Sampler is not put out of commission by foreign matter in the pipe line such as chips of wood, rags, pump valves, etc. (12) Standard interchangeable parts can be had from manufacturer at any time. (13) Samplers are small and compact and can be moved from place to place with a minimum of expense and trouble. (14) Sampler will function regardless of gravity of material passed through the line, it having no maximum or minimum limits. It will function satisfactorily at any practical line pressure above atmospheric pressure.

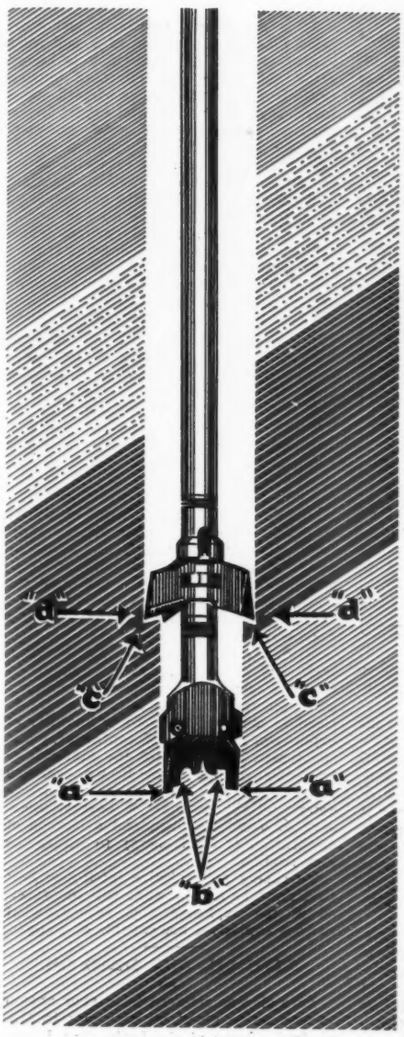
No claim is made by the manufacturer that the Keys-Hoag line sampler will definitely compensate for temperature changes over a wide scale or that it will give a perfect sample if the viscosity of the oil changes over a wide range, as, from fuel oil to gas oil.

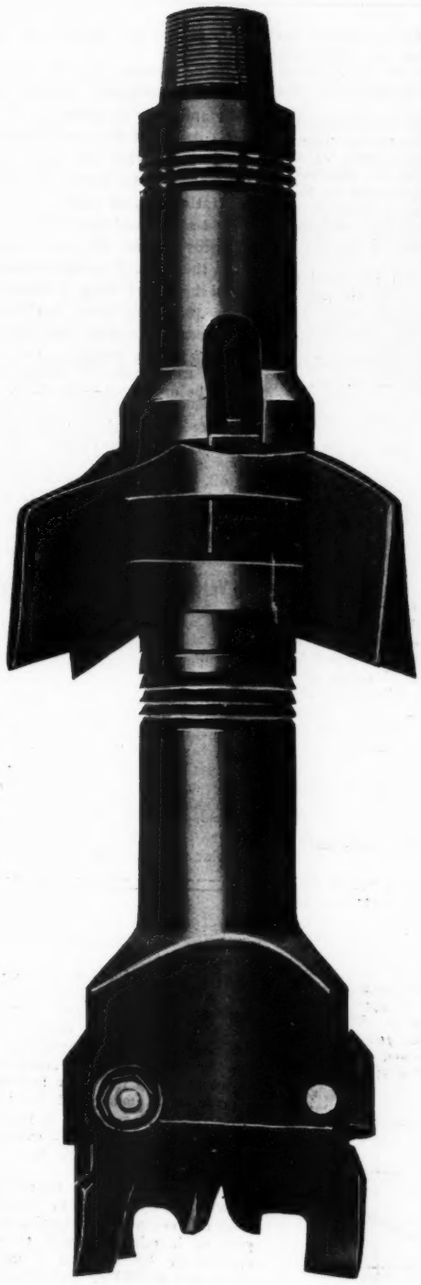
CONTRACT FOR PLANT MADE

The White Star Refining Co. has contracted for a debutanizer and stabilizer plant to be furnished by the Foster Wheeer Corp. This plant will be installed in Detroit, Mich., in connection with an existing gasoline absorption plant. The new unit will also process pressure distillate in addition to natural gasoline. The peak capacity of the plant will be 165,000 gallons per day of pressure distillate and 50,000 gallons per day of raw gasoline from the present absorption plant.

Among the articles in the February number of Oxy-Acetylene Tips, published by the Linde Air Products Co., New York, is one on "The Progress of Pipe Welding."

The B-2 Drilling Bit with Model 5 Reamer





Digs Straight Hole

—and a glance at the diagram on the left shows why.

The B-2 Bit serves as a pilot. It cuts a core with the outer teeth "a", which is then broken up with the inner teeth at "b"—which makes the going easier, and consequently, faster.

Just a few feet behind is the Model "5" Reamer. The reamers fit over the ledge of the hole made by the pilot bit, at "c". This, together with the firm contact of the reamers with side walls at "d", holds the entire string and pilot bit straight and counteracts any tendency to shoot off at an angle as so frequently occurs with ordinary bits.

This B-2 and M-5 combination is famous the world over for fast, straight hole. It is the standard by which others are judged. To be nearly as good as the "B-2" Drilling Bit and Model "5" Reamer means to be very, very good indeed.

For complete particulars with specifications covering various combinations, write for Bulletin No. 12-A.

GLOBE OIL TOOLS CO.

LOS NIETOS, CALIFORNIA.

Successors to
H. C. Smith Manufacturing Co., Inc.
Wieman-Kammerer-Wright Co., Inc.
National Tool & Metals, Inc.

Branches:
Ventura, Calif. Bakersfield, Calif. Kettleman Hills, Calif. Taft, Calif.
Hobbs, New Mexico Oklahoma City, Okla.

Field Problems and Their Solution

EDITED BY THOMAS F. SMILEY

In order that men connected with the drilling, producing and transporting branches of the petroleum industry may procure quickly a solution of many problems confronting them from time to time in their work, The Oil and Gas Journal has arranged with leading engineers and other recognized authorities to answer questions submitted by readers of this publication pertaining to the work of drilling and producing crude oil and transporting this product.

Everyone is invited to submit questions freely. These questions will be submitted to proper authorities by Mr. Smiley, who edits the page, and answers, based on the best available information, will be published. Each question should give as much detail as possible, especially where it relates to matters where depths of sands, types of sands and operations on adjoining properties would have a bearing on the problem involved. The source of all questions will be considered as confidential and only initials will be published in connection with the question.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or practices which are improvements.

In case an immediate answer is important, one will be given by mail if the writer requests it.

STRETCH OF SUSPENDED PIPE

Would you please advise us what basis is used for the rough calculations in the field for the amount of stretch of suspended strings of pipe or casing?—E.L.W.

An engineer for the National Tube Co. kindly provided this department with the accompanying graph showing the deformation or stretch over original length for pipe freely suspended by one end. This curve accounts for strings of casing up to 4,200 feet long only but because of the angle of the last part of the curve it would seem safe to project it in this same direction if estimate of stretch of longer strings of pipe is desired.

The formula upon which this curve is based was worked out by an engineer for the Empire Companies in Eldorado, Kans., and the engineer for the National Tube Co. recommended it as best answering your question.

It is of course possible to estimate the total stretch that can be put in pipe or casing within the elastic limit of the steel. This can probably be illustrated best by taking an example such as this:

"If a 4,000-foot string of 6⅝-inch 30-pound casing has been deformed 40 inches, how near has it approached the elastic limit of the steel?"

The factors here known are total deformation, 40 inches; total length of string, 4,000 feet; cross sectional area of pipe 9.741 square inches, modules of elasticity of steel, 30,000,000.

The unit deformation will be 40 inches divided by 4,000 feet × 12 inches, or .000833.

Unit stress will be 30,000,000 × .000833 or 24,990 pounds.

Total stress will be 24,990 × 9.741 or 243,527.59 pounds.

This shows that the pipe is under a total stress of 243,527 pounds when it has been stretched 40 inches in a 4,000-foot string and to ascertain the relative amount of strain placed on the pipe under such a condition and the total deformation it will stand, further calculations are required, as follows:

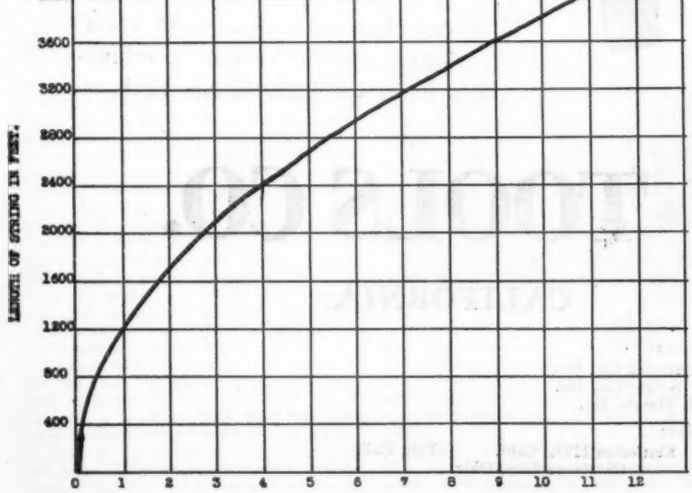
The 6⅝-inch 30-pound seamless casing has a tensile strength equivalent to the load set up by a string of this pipe 5,500 feet long, with a factor of safety of 2. Therefore, 5,500 × 2 equals 11,000 feet. 11,000 feet × 30 pounds equals 330,000 pounds, total weight of longest string that is permissible for this size casing.

$$\frac{330{,}000}{9.741} = 33{,}867.16 \text{ pounds unit stress.}$$

$$\frac{33{,}867.16}{30{,}000{,}000} = .0011289 \text{ unit deformation.}$$

.0011289 × 4,000 × 12 equals 54.08 inches total deformation this string would stand.

In giving you these two answers to your question it is hoped that you will not confuse the stretch in the pipe or casing that is hung free with the total stress that may be placed upon a string of casing before it will part. The second example is given so that you may have data as to how to proceed to find out the ultimate strength of a string of pipe or casing if desired.



DOES IT INDICATE OIL?

While passing through your section I noted the similarity of your lands, timbers and soils to those of this region. I am a native of Kansas, but have been in southern Georgia 15 years. Recently I purchased 1,380 acres of land, an old plantation settled years ago. Examining an old abandoned water well on the place I discovered an oily substance trickling from the sides. It occurred to me that oil could be found here. I understand that some 100 miles west of this county oil has been discovered, but they will not line up for a company to drill. What course can I take? I believe a company could be organized.—W. R. S.

Surface indications often are misleading with reference to underground conditions and the possibility of accumulation of oil. The material which you state is dripping into the old well may and may not be petroleum. It is suggested that you get a good sample of it and have it analyzed by a chemist familiar with petroleum problems.

A further suggestion is that you get all the information available from the state geologist of Georgia and make a careful study of it. This will give you some general ideas of the geological conditions of your area and you can decide whether it is worth while to follow this up further. If you feel encouraged by the reports from the state geologist it would be good policy for you to employ a competent geologist to make a report upon your particular tract.

You state that you have 1,380 acres. This is hardly enough to justify exploration, or even an investigation by a geologist, so it might be well to try to get options or leases upon a much larger tract, say 40,000 or 50,000 acres, which would make the proposition attractive to the larger oil companies.

With the options or leases upon a large block of land you could submit your proposition to the land department of any of the larger oil companies and if they were interested an agreement could be entered into by which they would promote the rest of the work. As they have complete organizations they could send geologists to make report on the area, and if the reports were favorable could arrange to have test wells drilled and other matters handled necessary to development of the property.

It would seem as though your first move should be to try to interest your neighbors and have them join with you in blocking out a tract of considerable size, for it will be hard to interest large companies in your own particular piece of land, but if the area is promising they might consider it favorably and take steps to make an investigation.

WHY WAS IT CALLED THAT?

FISHTAIL BIT

The appearance of this type of rotary bit, extensively used in drilling through the softer formations, might easily suggest the question, not why it is called a fishtail, but how it could be called anything else. The body of the bit is divided and forged in such a fashion as to provide two cutting edges, and it is these flat surfaces that give the bit a striking resemblance to the tail of a fish.

SELECTING THE EXPLOSIVE

Is it known with certainty just what happens in an oil well hole when a charge of nitroglycerin is set off in it? Does it make any particular difference which of the several oil-field explosives is used? I ask this question because the character of the formations differ a great deal and it seems not unlikely at least that one explosive material might do better for certain kinds of formations than others.—T. Y. H.

It is not known positively just what takes place at the bottom of a well when a shot is fired, but something is known about the action and effect of various explosives on a wide range of rock structures, says Paul F. Lewis, expert in explosives, who answers your question. Among many differing opinions as to what happens when an explosive is set off at the bottom of a well these might be mentioned: (1) That the gases evolved by the explosion, rushing up and out of the hole, cause a partial vacuum which draws the oil from the oil bearing strata; (2) that the shock of the explosion with resulting vibrations causes effervescence of the gas charged oil, causing it to bubble out of the hole like a carbonated beverage out of a bottle; (3) that the shock of explosion sets up vibratory waves of disruptive intensity, which tends so to break down the strata as to open up innumerable avenues of escape for the more or less gas charged oil.

When a shot is exploded, the effect is a miniature earthquake. That is to say, the explosive used is converted into a gaseous state at such terrific speed and high temperature that disruptive energy is developed which communicates itself to surrounding materials in vibratory waves of great initial intensity and rapidly diminishing effect, the extent of the disruptive effect being controlled by the type and quantity of explosive used, and degree of confinement, and the elasticity, structure, tensile resistance and shearing resistance of the material surrounding it. Of these factors, and in order to simplify a complicated problem, it is necessary to consider mainly the type and quantity of explosives, the degree of confinement and the tensile resistance of the material to be broken. Therefore, if we establish values for these factors, it remains to determine the amount of energy necessary to overcome them and a method of application of such energy to insure the best results.

To choose an explosive intelligently, it first must be known what will be expected of the explosive and, second, what various explosives are capable of doing.

LIVE OIL AND DEAD OIL

Live oil was referred to in your answer to a question about oil prospects in Mississippi. None of the books that I have tell what live oil is, not even the dictionary. Please explain the difference between live oil and any other kind of oil. —N. O. D.

Live oil is oil which contains gas produced with it from the well. Most of the oil produced is live oil. Almost all petroleum as it comes to the surface, either by natural flow or by pumping, is accompanied by gas that originated in the same formation that contained the oil. And even after the mixture is run through a separator, some gas usually remains entrapped in the oil. When this oil has been run into a tank minute gas bubbles may be seen breaking at the surface, giving it the appearance of being alive and leading to the designation "live oil." Petroleum that does not contain entrapped gas and that consequently is not characterized by the gas bubbles is called "dead oil."

California Citrus Crops Saved By Oil

When Freezing Weather Is Forecast Refiners Rush Smudge Oil in Special Trains to Orchards in All Parts of the State

By L. P. Stockman

Oil and oranges, although quite dissimilar, have much in common from an economic standpoint as the oil and citrus industries are California's biggest enterprises. One would not usually associate petroleum with oranges and lemons and yet the petroleum industry saved the citrus industry from loss through an unusually heavy freeze last December. This was accomplished by rushing smudge oil to all parts of the State in specially chartered trains which were given the right of way over all lines of the Southern Pacific and Santa Fe Railroads.

In meeting the emergency in the Lindsay district of the San Joaquin Valley, the Union Oil Co. and other major refiners shipped several hundred cars of orchard heater oil from their refineries in the San Francisco Bay region to the area suffering from heavy frosts. More than 200 tank cars of heater oil were dispatched by the Union alone from San Francisco to Lindsay, where the special trains were met by scores of hastily recruited tank wagons and the oil was sped to the orchards. The various oil companies, the railroads and the California Fruit Growers' Exchange kept growers supplied with heater fuel, but there were times when the storage of heater oil was practically exhausted.

One type of heater used to protect California orchards.

During periods of extremely cold weather in the orange belt, refiners are called upon to deliver heater oil in short time. In order to meet this emergency, refiners usually build up sufficient stocks to take care of normal requirements. It sometimes happens that a freeze is of longer duration than expected and consequently supplies of heater fuel in the various distributing depots are used up. This is what happened last December and forced the oil companies to charter special trains to protect the citrus industry. It is not practicable to carry sufficient heater oil in all distributing depots to meet abnormal conditions because several years may go by without any serious freeze and thus require only a minimum amount of heating.

State Uses 3,000,000 Heaters

There are 3,000,000 orchard heaters in use in California citrus groves. It requires about 22,000,000 gallons for one filling. This is based on an average capacity of 7 gallons for every heater, although most of the new types of orchard heaters hold approximately 9 gallons. On one filling of oil each heater will burn 10 to 15 hours, depending upon regulation for the amount of heat desired. Approximately 30 per cent of the total California citrus acreage, or about 75,000 acres, is equipped with orchard heating facilities. The amount of orchard heating oil used each year fluctuates with the severity of the weather, as the heaters are lighted only when the temperature reaches the danger point, about 28° F.

Approximately 60 per cent of all the oranges and from 75 to 85 per cent of all the lemons consumed in the United States are grown in California and extreme care is exercised to prevent destruction of the crop by freezing weather. The California Fruit Growers' Exchange maintains a regular patrol, and in conjunction with the United States Department of Agriculture maintains several bureaus for the dissemination of weather forecasts, especially during the winter months, when there is a possibility of a cold snap at any time.

Specifications for heater oil differ from year to year, but one requirement is that the asphaltum residue must be less than 3 per cent. Oils used at the present time generally contain less than one-half of 1 per cent carbon residue, varying with the different fields throughout the State. The maximum tolerance of sulphur in specifications generally prescribed is three-fourths of 1 per cent.

The specifications placed on heater oil at the present time is of particular interest when compared with early attempts at orchard heating. Back in 1913, when the advantages of orchard heating were not generally recognized, several enterprising growers in southern California began experimenting with the idea. The theory of combating freezing weather with orchard heaters was fundamentally sound and presumably would have worked out satisfactory at once if oil of the proper quality had been provided. During this early work near Riverside, Calif., the last car of oil delivered in the winter of 1913 for orchard heating purposes was so heavy that it was necessary to hire the county's steamroller to heat the oil so that it would run out of the car into the tank wagons. The heaters used at that time would burn for about three hours and then a perfect block of paving material was left in the smudge pots. Since then, however, there has been a steady improvement in the quality of the oil which is purchased according to definite specifications.

Heaters "doing their stuff" in California orange grove.

Over a 15-year period oil for heating purposes has averaged about $1.30 per barrel f.o.b. refinery, but in the last three or four years it has averaged about $1.15 on contract, but lower on spot deliveries. The low point was reached in 1924 when smudge oil could be purchased for 50 cents a barrel, and the high peak in 1919, when it jumped to $2.08. Practically every major company in California contributed to the relief of the citrus industry in the form of heater fuel rushed to areas confronted with freezing weather. At one plant every available conveyance was used for the hauling of heater oil and a line of trucks, three abreast, extended out from the loading rack for a distance of four blocks.

Two Types in Use

Two types of heaters are utilized in combating frost by California citrus growers. There are many variations of these and many individual types, all of which are built to specifications. Some orchardists use heaters which operate on either coal or oil briquettes, but the type

(Continued on Page 161)

HOW CALIFORNIA MET PROBLEM OF CURTAILING OVERPRODUCTION

By B. E. Parsons
General Petroleum Corp. of California*

Curtailment of crude oil production, to the extent of effecting an approximate balance in supply and demand, was a problem confronting the oil industry in California throughout 1930.

At the beginning of the year, with drilling operations only slightly checked, the California industry faced a steadily increasing potential production, an actual production in excess of market requirements and stocks of crude oil and refined products which had reached staggering proportions. During the year, the intensive development of the Playa Del Rey Field and extensions to several oil fields, together with flush production from numerous large wells from both new and old fields, caused a steady increase in the State's potential production to a record peak in November of 1,186,000 bbls. daily.

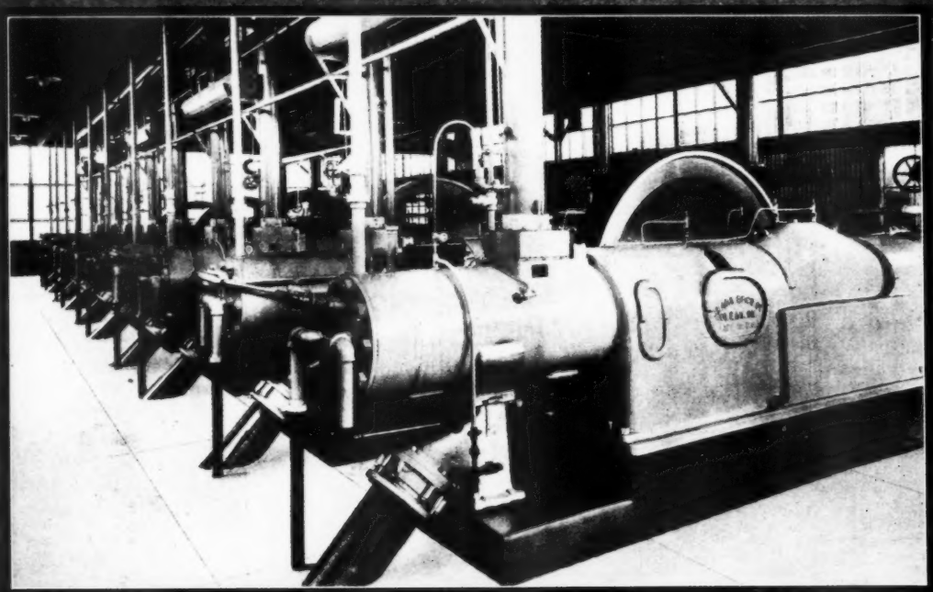
Despite the burden of this steady stream of flush production and the handicap of incomplete co-operation in several fields, curtailment of crude oil production successfully lowered the trend of crude oil production in California, except for the period of an open flow test to determine actual potential production in several important fields in February. Under the curtailment programs in effect, the State's production of crude oil for the year was reduced 22 per cent under the production of 1929 and even slightly under the production for the years 1927 and 1928. The total stocks of crude oil and refined products were reduced 2.7 per cent during 1930, compared to an increase of 30 per cent in total stocks of all products during 1929.

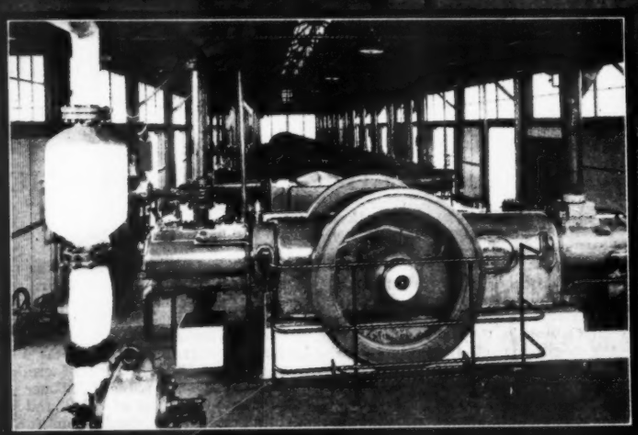
Drilling operations were reduced 28 per cent compared to 1929. Voluntary curtailment of drilling programs by many operators, particularly the major companies, accounts for the greatest portion of the reduction in drilling activity. The decline in drilling activity at Santa Fe Springs and in the east side fields of the San Joaquin Valley during the year was more than offset by development in new fields and extensions to deeper zones of

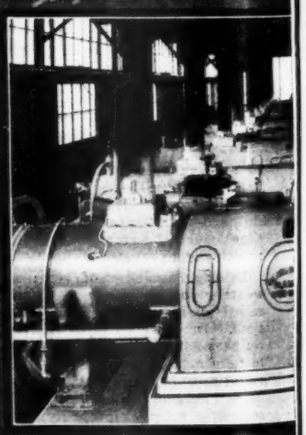
(Continued on Page 158)

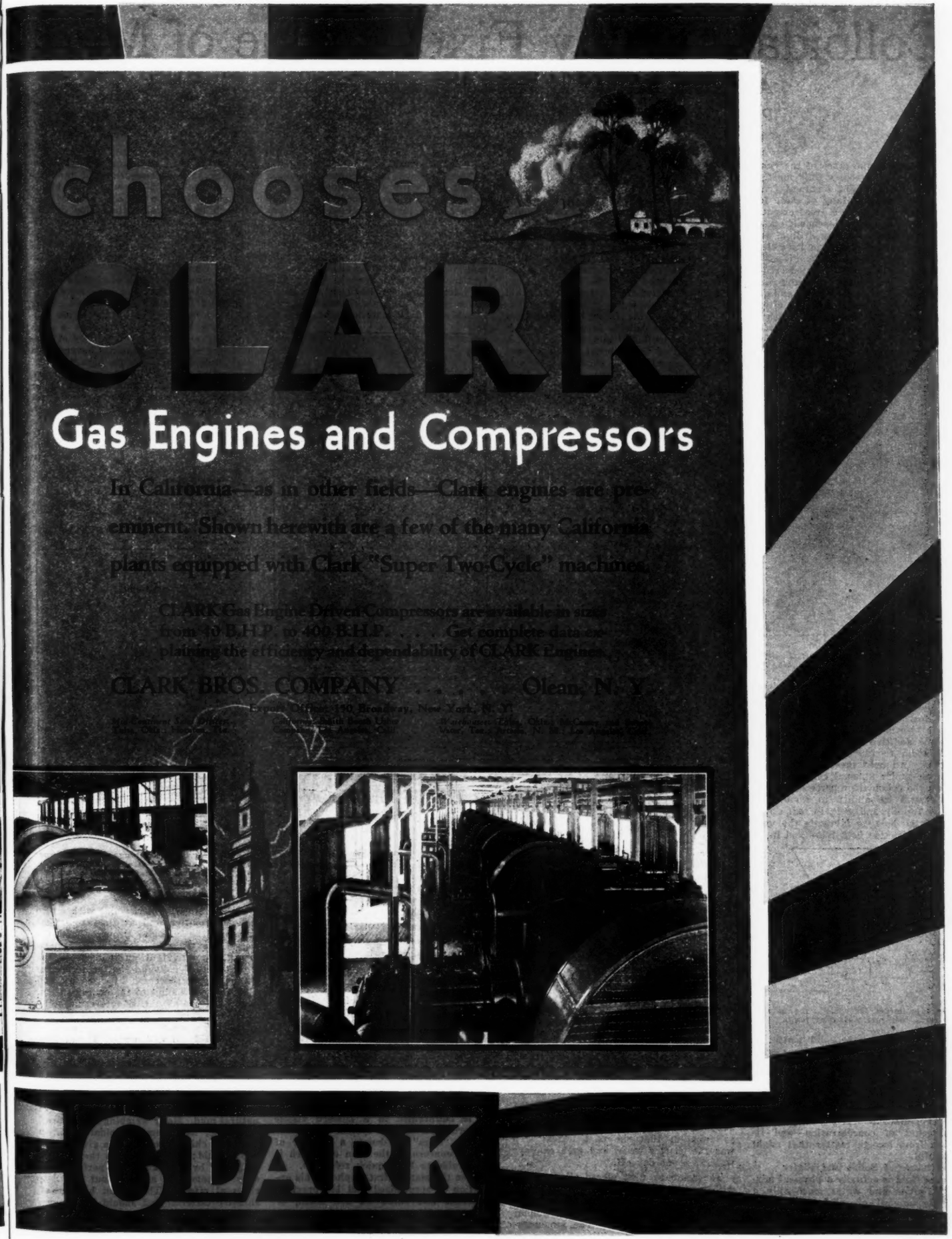
*Before Petroleum Division, A.I.M.E., New York.

California








chooses
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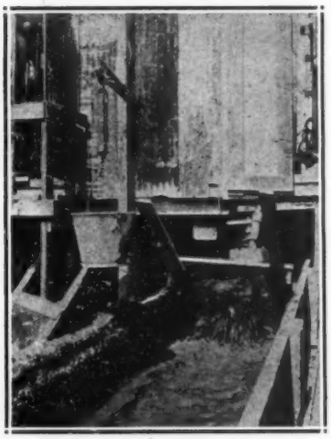
Colloidal Quality Fixes Value of Mud

Admixture Adopted to Provide This Property or to Replace It as It Is Used Up Has Important Function to Perform

By W. A. Sawdon
Petroleum Engineer, Los Angeles, Calif.

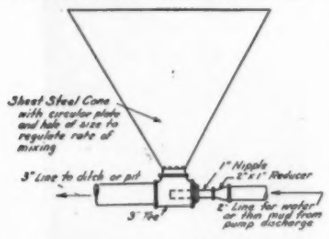
The relative importance of the various functions which a rotary fluid must perform is naturally not identical for all drilling conditions. Many of these functions are influenced to a great extent by, and in some cases are dependent on, similar characteristics of the drilling fluid. The weight of the fluid and its colloidal qualities are probably the main positive properties that need to be considered for obtaining a satisfactory drilling fluid; but the elimination of abrasives and other harmful foreign matter must be effected to the greatest extent possible, although their action in the fluid may be alleviated



A bucket and spring hanging over the ditch. This is one method used for weighing the mud fluid at intervals.

somewhat by colloidal action. Some natural muds meet the ordinary requirements for a satisfactory drilling fluid without treatment. Many, however, require the addition of other materials to enable them to function properly; and practically all need these materials—admixtures—under unusual conditions.

Upon the colloidal properties of a mud fluid depend its ability to remove the cuttings rapidly and well, to seal up the walls of the hole, to lubricate the walls and reduce friction both there and in the


Sheet Steel Cone with circular plate and hub of size to regulate rate of mixing
3" Line to ditch or pit
1" Nipple
2" x 1" Reducer
3" Pipe
2" Line for water or thin mud from pump discharge

A jet type mixer for introducing admixtures into rotary drilling fluids.

pump, and to keep the solid matter in suspension when circulation is discontinued. An admixture used to supply this property to the fluid or to replace it as it becomes used up has an important function to perform. It must, therefore, be selected with due consideration of its colloidal qualities—their effectiveness and amount of concentration—and its freedom from foreign matter that might be harmful.

Mixture of Solids and Water

A mud fluid is actually a physical mixture of solids and water since only a negligible amount of solid matter contained in the clay from which it is made goes into solution. Practically all the material divides into its smallest fragments when wetted and these small fragments are held in a state of suspension in the liquid. Some of these fragments are so small that they stay in suspension with such stability that they form a mixture closely approaching a true solution. These are the colloids, the materials which give the mud fluid its desirable suspension quality and which go into a semiplastic state—or "gel"—when allowed to stand quiet for a short time. This gel immediately returns to a fluid form when agitated.

The size of the fragments which can be classed as colloids is usually considered as below 0.0001 mm. in diameter. A great deal of the material which is used for making mud fluids contains other solids besides clay. These generally have no colloidal properties, while the clay itself is far from being composed entirely of colloidal material. This is evident from the following table which gives Atterberg's classification of minerals, according to the size of the fragments:

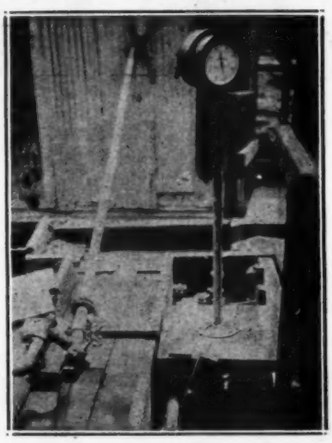
Sand	—2 mm. to 0.2 mm.
Earth	—0.2 mm. to 0.02 mm.
Loam	—0.02 mm. to 0.002 mm.
Clay	—Smaller than 0.002 mm.

It can be seen then that, although clay will contain all the colloidal matter in the mud, a clay may contain few or no colloids; and the mere fact that it is clay is no assurance that it will make a satisfactory mud fluid for drilling. The nature and quantity of active colloidal matter present are the important factors and they must be considered in the admixture as well as in natural mud.

Involves Question of Economy

The amount of admixture necessary to provide colloidal qualities to a mud that is deficient in them, or has lost them through use, is a question that involves the matter of economy. In discussing drilling mud, Prof. John Franklin Dodge of the University of Southern California states that "Ordinary clays, such as are used for drilling fluids, have the property of breaking down into fine particles when wetter with water and thereby form rather stable suspension at concentrations of 25 per cent to 45 per cent by weight solids. The highly colloidal clays, especially those which have been processed and stabilized, possess the ability of forming stable suspensions in water of the same viscosity as drilling muds at concentrations as low as 5 per cent by weight."

In actual practice, however, an investigation in the California fields shows that a highly colloidal material, when used as



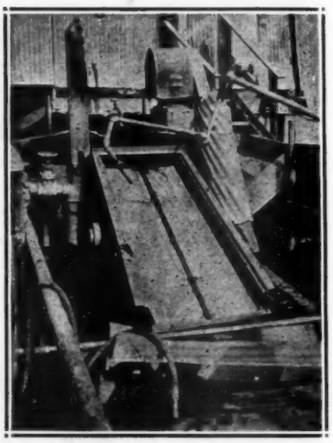
Automatic recording mud scales. An indicating and a recording gauge are placed back to back as shown here. These are actuated by a spring type dynamometer attached to a conical shaped hopper (below the stand) through which mud fluid is continually circulated.

an admixture, is generally introduced in amounts of about 2 per cent by weight. In this application, the mud fluid is usually thinned before mixing. The admixture thus replaces some of the noncolloidal solids and results in a highly colloidal fluid with a viscosity low enough to be most suitable for drilling purposes. For special cases—such as regaining circulation, running casing etc.—the amount of admixture is increased and has been used with water alone up to 10 per cent by weight.

The viscosity of the mud fluid is too often conceived to be an accurate indication of its colloidal properties. Since viscosity is increased by the solids contained, a mud fluid may have a high viscosity and yet consist entirely of noncolloidal solids and water. Conversely, a fluid can be made with high colloidal properties and yet have a viscosity low enough to be readily pumped. This factor is important since pump pressures must be kept at a minimum. Moreover, a high viscosity retards the settling out of the drill cuttings and any excessive viscosity will probably retain harmful ingredients as well as make the fluid difficult to pump.

Good Fluid Control an Advantage

The advantage of good fluid control is evident and since a colloidal property is absolutely necessary in the mud, it will frequently be most advantageous to replace some of the inert solids with active colloidal matter and at the same time increase the colloidal property and decrease the viscosity. It must be remembered, however, that an increase in the percentage of colloidal matter is accompanied by an increase in viscosity and that there is a limit to the concentration. An admixture should, therefore, never be added to a mud fluid that has already reached the maximum viscosity until it has been diluted with water. It can then readily be regulated as to both its colloidal properties and its viscosity.



A vibrating screen through which returns from the well pass directly into the suction pit. It is said that colloidal or weight materials are not removed from the mud by this screen which is 30-mesh.

Colloidal matter does not endow a drilling fluid with weight. An admixture that posseses colloidal qualities to a high degree may weigh less than the average natural mud. Many weighing admixtures, of course, have some colloidal qualities but their chief function is to give weight to the fluid; for that reason they should be judged by their ability to perform this duty economically and without any detrimental effects. They must be free of abrasive material and should be as nonsettling as possible.

There is naturally a limit to the per-

(Continued on Page 161)

STANDARD OIL OF CALIFORNIA'S RELATIONSHIP WITH EMPLOYES

By J. E. Norton
Standard Oil Co. of California

There are few affairs of the Standard Oil Co. of California in which both management and employes take more pride than the cordial and friendly relationship which exists between officials and the men in the ranks. Strikes and labor troubles are unknown to the Standard Oil Co. of California because the officials have at all times kept the interest of the employes in mind, and have gone as far as possible to make working conditions, wages, hours and safety so attractive that every employe guards his record jealously.

The Standard Oil Co. was one of the first major concerns in the United States to abolish the 12-hour day. Many years ago the company realized the importance of shorter working hours to provide time for recreation and rest. Accordingly, the eight-hour day was put into effect for all employes, and as a result the output per working hour was greatly increased. The benefits from shorter working days were so apparent that the next logical step was the shorter week, and each employe was given one day off.

The company next placed all employes with one year or more of service on a monthly salary basis, and extended to these employes the privilege of an annual vacation with full pay. The announcement of this policy was soon followed by another, which provided a plan for sick benefits, life insurance and pensions for all employes with one year or more of service, the payments to be made in proportion to the employe's salary and length of service.

Personnel Department

All of these benefits are thoroughly understood and appreciated by the entire force, but few understand the thought and effort expended by our personnel department to aid the employes further. A most important function of the field offices of the personnel department is the keeping of records, particularly at the refineries, where a large number of men are employed in a complex variety of crafts. Considerable study has been given to the problem of classifying the employes according to their ability and promise. Under the system which has been developed, a man's employment record is maintained in a modern visible file, provided with a system of colored tabs or "flags" to denote a number of matters concerning the man on which it is desirable to have quick reference.

When the man is first employed, his application is scrutinized and his previous experience and education are noted, or "flagged." His current experience with the company and any further efforts

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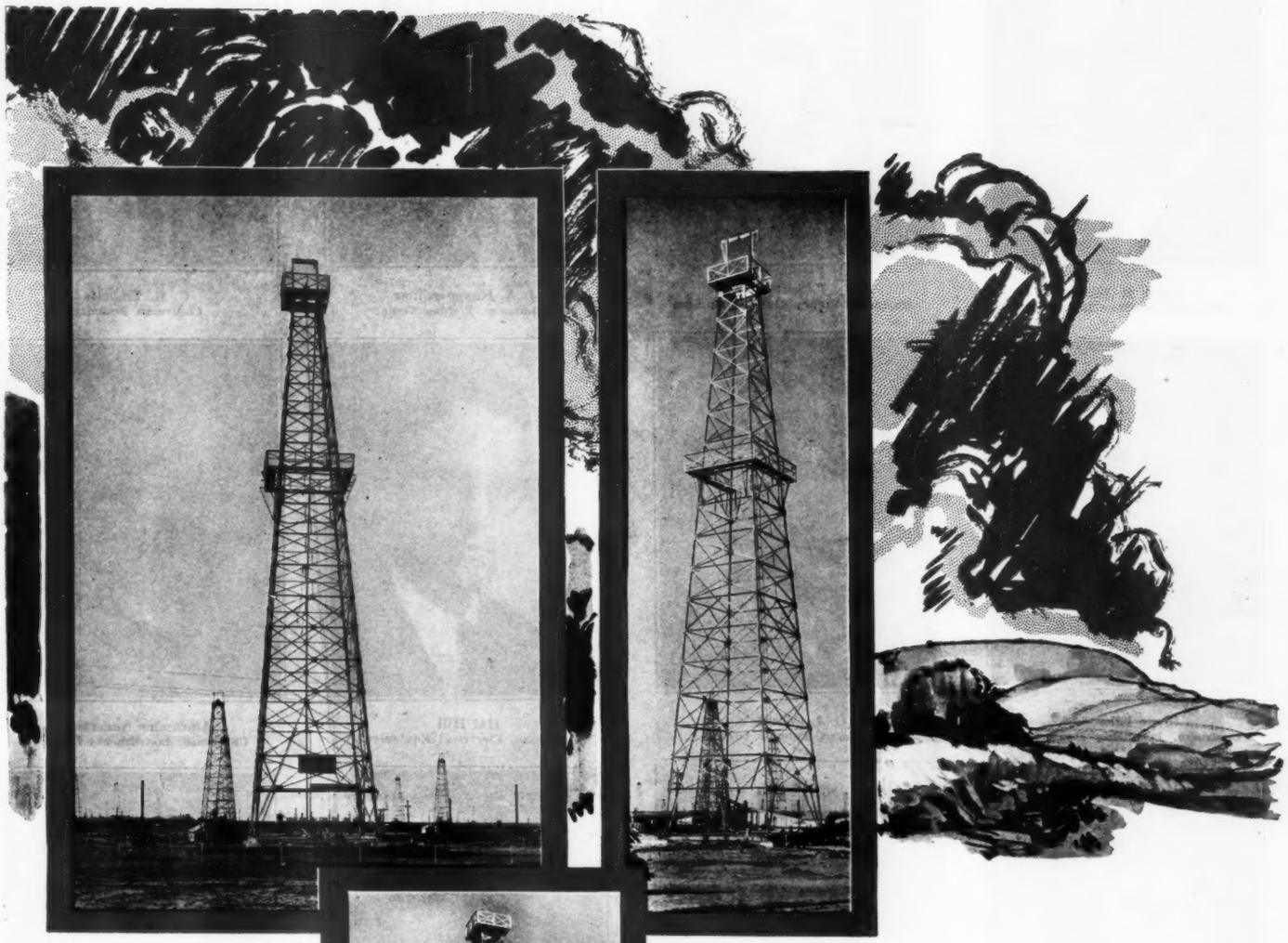


Moore Champion 122 foot Derrick, Santa Rita Well No. 2 of the Big Lake Oil Co. This well, 8603 feet deep, is one of nine wells in Big Lake Field all below 8500 feet. These nine Moore Derricks have drilled the world's deepest producers.

The University B-3 Well of the Group No. 1 Oil Company drilled to a depth of 8649 feet by this Moore 122 foot Champion Derrick.

Test well of the Stanolind Oil Company being drilled by a 94 foot Moore Champion Derrick and type No. 90 Moore Samson Post and Jack Post. This illustration also shows Moore D-W Walking Beam, type No. 30 Pitman and OCS chain-driven Sand Reel. Present plans are to drill to a depth of 8000 feet, unless production is secured at a lesser depth.

Moore Champion DERRICK

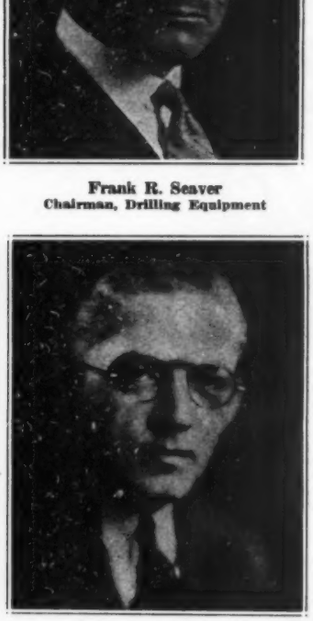
CHAIRMEN OF TECHNICAL DIVISIONS AT LOS ANGELES EXPOSITION

Frank R. Seaver
Chairman, Drilling Equipment

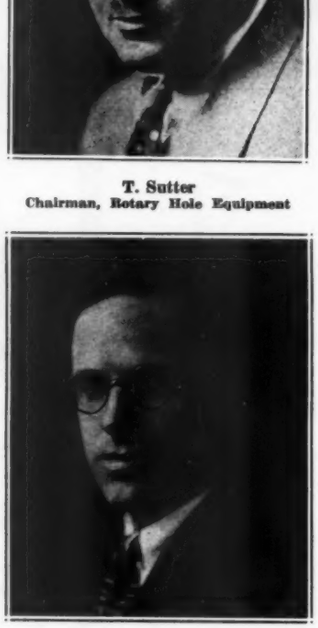
T. Sutter
Chairman, Rotary Hole Equipment

J. A. Kammerdiner
Chairman, Fishing Tools

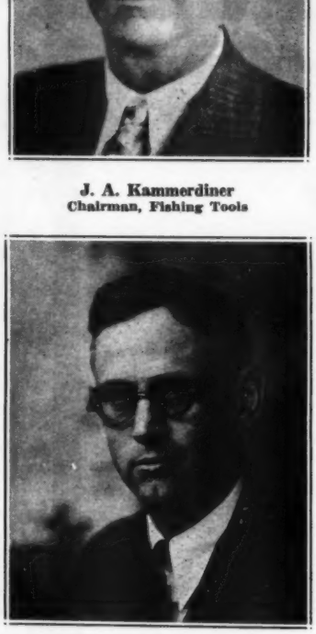
C. B. Tibbetts
Chairman Foundry



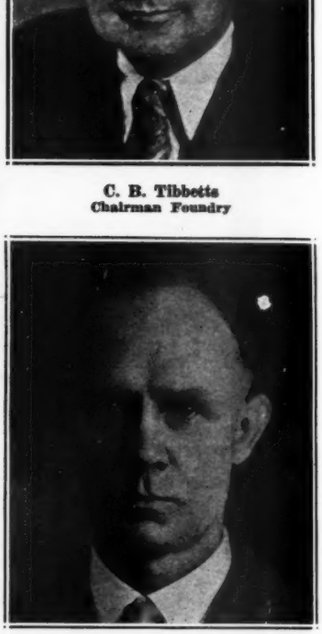
Clyde Ellwood
Chairman, Producing Equipment



C. J. Coberly
Chairman, Tubular Goods



Hal Hill
Chairman, Electrical Equipment



Alexander Anderson
Chairman, Instruments Division

C. D. Coulter
Chairman, Refining Equipment

C. Homer Spotts
Chairman, Pipe Coating

G. T. Brooke
Chairman, Valves and Fittings

W. R. Martin
Chairman Export Meeting

J. C. Blake
Chairman, Welding Equipment

A. B. Leonard
Chairman, Hard Facing Material

George L. Ratcliffe
Chairman, Drilling Fluids

Bert A. Cleveland
Export Meeting Committeeman

Getting California Show in Readiness

Preparations for Oil Equipment Exposition Practically Completed, With Many Interesting Engineering Features Announced

By L. P. Stockman

LOS ANGELES, Calif., Mar. 9.—Final preparations for the opening of the second annual Oil Equipment and Engineering Exposition in Los Angeles March 16 are practically completed. The facilities provided by the new buildings which were erected last August have made installations much easier than last year and the foresight of both the exposition management and the exhibitors has done much toward eliminating confusion which usually attends the opening of a big oil show.

Time and money have been expended this year in decorations and most of the

A. J. Lenzner
Manager of Exposition

booths have been "dressed up." Most of the heavier type of machinery which will be placed in operation has been installed and present indications are that every exhibit will be ready for inspection when the doors are thrown open at 10 a.m. next Monday. Credit for the efficient organization which has been developed is given to E. G. Lenzner, manager.

The design of the main exposition building lends itself to ease in setting up the heavy types of equipment; the reinforced concrete flooring permits all pieces to be hauled in by trucks to their exact location and unloaded practically in place. Many exhibits were installed for the permanent exposition and this also has aided materially in working out the design for the annual show.

The exposition organization includes a series of technical divisions and all inquiries, especially from foreigners, with reference to operating methods will be referred to these divisions. Such inquiries, of course, are of a technical nature only and do not involve equipment itself, since all matters pertaining to specific tools and machinery are referred to each manufacturer of the type in question.

L. C. Harbert
Export Meeting Committeeman

Division Chairmen

The chairmen of these technical divisions are as follows: Drilling fluids, George L. Ratcliffe, California Talc Co.; drilling equipment, Frank R. Seaver, Doheny Stone Drill Co.,; rotary hole equipment, T. Sutter, Baker Oil Tools, Inc.; fishing tools, J. A. Kammerdiner, J. A. Kammerdiner Co.; producing equipment, Clyde Ellwood, Axelson Manufacturing Co., Ltd.; tubular goods, C. J. Coberly, Kobe, Inc.; electrical equipment, Hal Hill, General Electric Co.; refining equipment, C. D. Coulter, Southwestern Engineering Corp.; pipe coating, C. Homer Spotts, McEverlast, Inc.; valves and fittings, G. T. Brooke, Crane Co.; welding equipment, J. C. Blake, Victor Welding Equipment Co.; hard facing material, A. B. Leonard, Haynes Stellite Co.; foundry, C. B. Tibbetts, Los Angeles Steel Casting Co.; instruments, Alexander Anderson.

Another meeting has been scheduled to be held in the technical hall of the exposition on March 19. It will be conducted by the Independent Petroleum Association of California under the direction of W. E. Dunlap, executive director, and

Lawrence Whitman
Office Manager

Robert L. Smith, assistant director. This is a recently organized co-operative association which will represent the independent operators as one unit. Its aims will be presented at this meeting. It will be pointed out that many federal and state laws are being proposed which will directly and seriously affect the industry and, since they cannot be coped with individually, they must be dealt with collectively by those whose interests are concerned.

Export Meeting

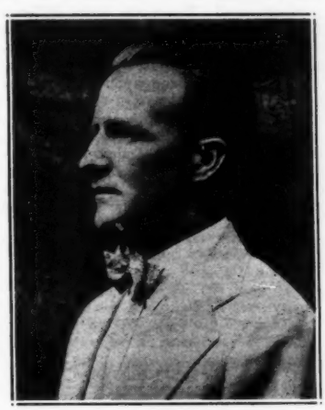
Besides the technical meetings, there will be an export meeting on the evening of March 18. This will be of importance to manufacturers of American equipment who are interested in the foreign market. Several speakers will present information relative to the conditions affecting the use of American equipment in the various foreign oil fields and will discuss the methods which may develop to increase export trade. The patent situation in each country will be given attention and the means for improving service, installation and distribution will be pointed out. The exportation of American equipment for use by foreign oil companies is becoming of increased importance and all data relative to this subject is being eagerly sought by manufacturers. The exposition offers facilities for presenting these data since most of the interested companies will either be exhibiting at the show or will be in attendance.

On March 17 the American Welding Society will hold a dinner and a meeting in the technical hall. Several papers discussing the application of both oxyacetylene and electric arc welding to the various branches of the petroleum industry will be presented. The society will also put on demonstrations of interest to all oil men.

"Straight Hole" Meeting

A "straight hole" meeting will be sponsored by the American Institute of Mining and Metallurgical Engineers on the afternoon of March 18. Instruments for surveying completed wells and other devices for showing the angle at which a well is inclining from the vertical during actual drilling operations will be described and discussed. The various methods being used for determining the direction in which a crooked hole has wandered will be described and the success attained will be illustrated.

The California Natural Gasoline Association will hold a dinner and meeting at the Alexandria Hotel on March 19. Papers here presented will deal with subjects of particular interest to those connected with the manufacture of natural gasoline. The association will have a



W. A. Sawdon
Publicity Manager

booth at the exposition and will there have available information of value to those connected with the natural gasoline industry.

Two meetings are scheduled for March 20. The Southern California Meter Association will hold a dinner and technical sessions at the exposition and will present discussions of the measurement, regulation and control of natural gas. The American Petroleum Institute, Division of Production, will hold its meeting at the Engineers Club, where papers will be read on the design of rig foundations and cellars. Applications now being used in the Kettleman Hills Field will be discussed. Two papers will be given on vapor recovery. One of these will treat the subject from the theoretical side and the other will introduce practical applications.

A joint meeting of the Associated Advertising Clubs, the Los Angeles Chamber of Commerce and the Oil Equipment and Engineering Exposition will be held at the Biltmore Hotel on March 17 at 12 o'clock noon. Following a luncheon, addresses will be given. Invitations have been sent to Ray Lyman Wilbur, Secretary of the Interior, and to Governor Rolph. Other speakers will include men prominent in the oil industry, representatives of foreign oil companies and one of the directors from the Independent Petroleum Association. The meeting will be broadcast over KFI.

Outdoor Features

Among interesting features of the exposition will be demonstrations on the outside space. The American Welding Society will show the adaptation of both oxyacetylene and the electric arc methods of welding to all classes of construction and repair work for drilling, production, transportation and refining. Two different methods of extinguishing and

W. J. Blankenship
Technical Manager

controlling oil fires will be demonstrated. These will present the latest developments in the equipment and methods for overcoming this ever-present hazard. Other demonstrations will be put on by individual companies to show specific applications under actual field conditions.

Many technical exhibits will be shown. These will feature laboratory and research work and will show the scope of such work in meeting the increasing problems confronting the industry. New inventions of tools which have not yet been placed on the market will also be displayed. These will be in the form of models or drawings, accompanied by full details regarding construction, operation and application. Their exhibition will offer manufacturers an opportunity to appraise them and to make contacts with the inventor.

Since the second annual Oil Equip-

(Continued on Page 169)

W. E. Dunlap
Executive Director, Independent Petroleum Association of California

One Kettleman Guess Good As Another

Estimates of Probable Recovery From This Rich California Field Depend Upon Optimism or Pessimism of the Estimator

By Stanley C. Herold, Ph. D.*

An estimate on production appears to be an opinion, usually implying a careful consideration of incomplete data, while a guess seems to require little thought and no data. Perhaps between estimates and guesses there exists a happy merging ground wherein it becomes difficult to make distinctions. Here we may picture geologists and engineers in

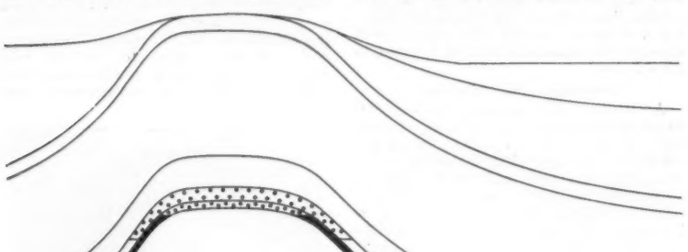


Figure 1—The fold simple, the strata uniform and not faulted.

filmy costumes dancing lightly, swinging garlands of roses, over soft sweet-scented meadows, while pretty maidens, their stenographers, similarly dressed, play beautiful music on stringed instruments of ancient design.

"Fifty thousand barrels per acre," sings one geologist with Kettleman Hills suggested. "Two hundred and fifty," sings another, while the engineers take their round numbers between, all stepping in sensuous rhythm, never tiring, ever smiling. On go the strains of the lyres!

To be sure, we do not know what we

Figure 2—The fold complex, the strata uniform and not faulted.

are talking about when we discuss Kettleman Hills. One estimate, today, seems to be as good as another. Our opinions depend upon our pessimistic, conservative or optimistic natures. The data are truly incomplete. To begin with, not all of us will look upon the Kettleman Hills North Dome as one big kettle. It is just that. Where we dip gas and oil out, something must go in. This something is water—edge water. In the kitchen a hole in the bottom of the kettle will, given time, allow all the contents to escape. The bigger the hole, or the more of equal sized holes, the less the time. On the dome the kettle is inverted. Otherwise the analogy is correct. As stated long ago, a string of ten or twenty wells along the axis will drain all gas and oil from the Temblor formation on the dome proper, given full penetration of the formation at these wells.

What Do We Mean by Recovery?

What do we mean when we speak of recovery per acre? Do we have in mind acre-contents of the formation, or well performance? These are quite different, for nature provides no impassable wall between wells in this field. Acre contents can be estimated, and well performance will depend upon such an estimate, plus a consideration of the location of the well on structure and the number of other wells, with their locations, on the same structure. Today it is impossible to forecast well performance. Production curves will hot help us in the task. The curves are now declining, but some day they will go off horizontally. For how long? For wells on the axis they will travel so until the acre contents for all acres have been drawn from the reservoir, and for all other wells a shorter time denoting the complete encroachment of edge water.

We do not know how many acres at the North Dome are underlain by Temblor saturated with gas and oil. However, 25,000 is a fair estimate perhaps, considering the position of an alleged lowest closed contour at 7,800 feet below sea level. But our ideas of this as a lowest closed contour may be in error. In the future we will have a better idea about this. Again, we do not know the total thickness of the Temblor at any place on the dome. The deepest penetration is approximately 1,400 feet. Would 1,500 see bottom? Would 2,000 feet? Possibly deeper yet? The latter is hardly conceivable perhaps.

The Elliott zone of 1,000 feet at the top of the Temblor has an average porosity of 12 per cent. We do not know the porosity of the Ochsner zone of 400 feet below. Perhaps it is more or less of the same value. The Elliott zone contains wet gas and a colorless condensate we call oil. What does the Ochsner zone contain? It appears to have less gas and a normal black oil of fairly high gravity. Both zones are made up of an uncounted number of strata. These are undoubtedly homogeneous in texture individually, as they extend over the dome, but among them we find all gradations conceivable between sandstone, shaly sandstone, sandy shale, and shale proper. We have little or no data on the permeability of these various strata, but of course these data are unnecessary in computing acre contents. Only the porosity and gas-oil contents of the pores, as these exist under heat and pressure, are required. Temperatures and pressures we know fairly well.

Let's Try Some Data

Let us try a dose of data, right or wrong, and see what happens:

Number of acres on North Dome	25,000
Contents per acre (as received at surface):	
Condensate or oil	67,000 bbls.
Natural gasoline	33,000 bbls.
Dry gas	1,500,000 m.c.f.

It is evident that the acre contents in total liquid are here assumed to be 100,000 bbls., seemingly a conservative figure. The gas-oil ratio is taken at about 22,400 cubic feet per barrel, for the original ratio of the field is probably the best to be used today. To continue:

Market value of oil	$1.65 per bbl.
Market value of gasoline	.05 per gal.
Market value of dry gas	.10 per m.c.f.

As to the dry gas we can guess that one-quarter will go to the winds, and three-quarters will find the market. Of course it may be advisable to guess again at some future date.

We can now compute the market value per acre content:

Oil	$110,550
Gasoline	69,300
Dry gas	112,500
Total	$292,350

This total, when multiplied by 25,000, gives a gross market value to the contents of the dome approximating $7,000,000,000. Well, this may be about right. However, it is possible that we have taken the content low and the acreage high. A different value of the gas-oil ratio, which may be found advisable to use in the future, will not modify our computations greatly. If we cut the gross as we have it in two we can still be certain that the North Dome of Kettleman Hills is the greatest deposit of fluid hydrocarbons yet discovered. No other known field can approach it in value.

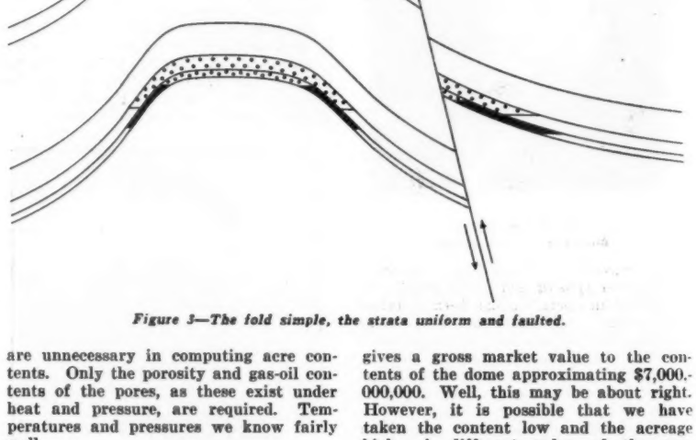


Figure 3—The fold simple, the strata uniform and faulted.

Promised Life of Field

What is the promised life of the field? That depends upon the rate of production from the field. At the following daily

(Continued on Page 165)

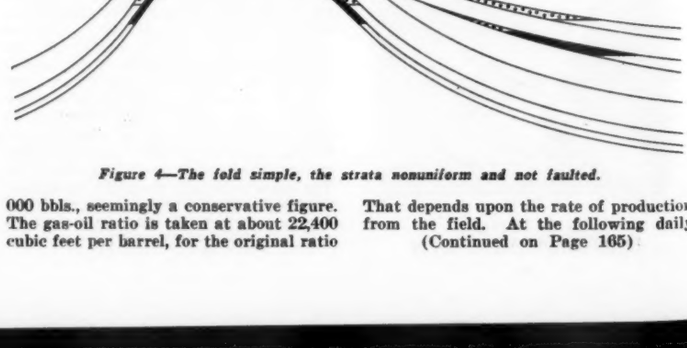


Figure 4—The fold simple, the strata nonuniform and not faulted.

*Doctor Herold has served for the last year, by appointment of Dr. Ray Lyman Wilbur, Secretary of the Interior, as engineering umpire at Kettleman Hills. He is a consulting geologist and engineer, 756 South Broadway, Los Angeles. He also is a contributing editor on the staff of The Oil Bulletin, official publication of the California Oil and Gas Association. This article is published by courtesy of The Oil Bulletin.

Use of Refrigeration in Gasoline Plants

Much Benefit Could Be Derived by Supplementing Present Methods of Extraction by Some Form of Refrigeration

By F. L. Kallam
Chemical Engineer*

For some little time there has been an undercurrent of feeling within the industry that much benefit could be derived if our present method of gasoline extraction were supplemented by some form of refrigeration. It is the purpose of this paper to stimulate this interest in refrigeration by presenting a semitechnical discussion of past methods and possible future adaptations.

We all realize, probably better today than ever before, the failure of one industry to utilize and adapt to its own peculiar conditions certain phases and technology of a contemporary industry. We must not fail to profit from our own recent laxity in this respect; I refer to our failure earlier to take advantage of certain fundamental knowledge pertaining to fractionating already worked out and reduced to practice by numerous units of the chemical industry. Likewise, we must not fail to remember in thinking of refrigeration that we can turn for guidance to the refrigeration industry itself, an industry, by the way, with commercial ancestry dating back to 1823, and with a present valuation, exclusive of buildings, of well over $1,000,000,000. Here we can most certainly find precedent and soundness of principle. Coming closer to home, we have valuable historical information from our own industry which can perhaps be profitably reviewed at this time.

First Produced by Refrigeration Method

Common understanding of refrigeration confines the meaning to the production of temperatures below that of freezing water, 32° F. Broadly speaking, however, refrigeration is the process of cooling or heat removal. Taking this latter and more technically correct viewpoint, we must recognize that refrigeration was responsible for the birth of our present industry in 1903. In that year, across the Ohio River from Sistersville, W. Va., two oil wells were producing casinghead gas. This gas was pumped a distance of 3 miles and utilized for boiler fuel, but as winter came on, with the resulting lowering in atmospheric temperature, condensation of gasoline occurred. The accumulation of this liquid in low spots of the line caused the owners considerable annoyance and eventually led to the installation of bleeders. The gasoline so bled from the line was thrown away until the enterprising firm of Sutton Brothers and Edmonds developed a market for these 70 gravity drips. It became their daily habit to collect the gasoline in wooden barrels which later were barged down the river to Parkersburg and sold. With the return of warm weather production fell off and the ready and lucrative market could no longer be supplied. Whereupon, some now unknown genius conceived the idea of refrigerating the gas, and the line drips were replaced with a system of coils placed in tanks containing relatively cold running water. Production was thus maintained throughout the year and the cornerstone laid for a future great industry.

Use of Compressors

Because this first venture, as well as numerous succeeding ones, proved a commercial success, attention was turned to the designing of better equipment. The low pressure gas pumps, quite often driven from the walking beam of the well itself, were used until about 1905. In this year, William Richards, at Mayburg, Pa., astounded the populace by installing and operating the conventional type of compressor at pressures in the neighborhood of 400 pounds. He soon discovered, however, that 250 pounds was sufficient to make gasoline of commercial grade, and this pressure was used by practically all the later compression plants. At this stage of development numerous types and arrangements of gas coolers were used, starting first with the air cooled type, and eventually leading to the many variations of the submerged and open water cooled devices. It was universally admitted, however, that the desired cooler was the one resulting in the lowest final gas temperature because of the resulting larger gasoline yield.

Cooling by Free Expansion of Gas

It was quite natural that attempts to refrigerate the high pressure wet gas to temperatures below that obtainable with the ordinary means came into vogue. The first of these methods involved the expansion of the high pressure dry gas through an orifice or valve into a region of low pressure, generally 10 to 15 pounds. As the temperature of the gas after expansion was lower than before, it was used as a cooling means in an exchanger for removing heat from the high pressure wet gas. The refrigerating effect gained through such expansion was surprisingly low and in no case is it recorded where the temperature of the wet gas was lowered enough to be of material benefit. Yet it was considered for years as a necessary auxiliary in compressor plant practice.

Cooling by Means of Expander Units

In this quest for a means of subcooling the high pressure wet gas it is strange that the Heinzerling patent, issued in 1897, was entirely overlooked until nine years later. In this patent there is shown a gas compression cylinder and a gas expansion cylinder, both coupled to a single flywheel. The specifications clearly explain that after compression in the first cylinder the gas is cooled in an interchanger to a temperature as low as possible using water as a cooling medium. Condensation resulting from this operation is then removed by appropriate valved containers connected with the interchanger. The cooled gas now passes to a second interchanger cooled by the residual gas from the system, which in the meantime has been allowed to expand in the second cylinder, thus aiding in the work of compression in the initial cylinder. The expansion produces cold gas which afterwards, circulating through last interchanger, cools the compressed gas to a point stated to be between —13 to —40° F., resulting in further condensation.

This type of compression plant was never used in the eastern fields of the United States. Without doubt this was due to the fact that the gas contained relatively high percentages of the higher hydrocarbons, making it possible to obtain an adequate recovery by resorting to water cooling alone. Records of the early plants in this region show that extractions of 13 gallons per thousand were not at all uncommon. In the Mid-Continent fields, only a relatively few expander plants were built, leaving their widest use to be in California.

Between 1911 and 1920 practically every compression plant in California had its expander unit, such units generally were credited with producing 25 per cent of the entire production. Today there remains but one such plant in California. The temperatures actually obtained from such units, as measured on the high pressure wet gas side of the exchangers, varied from —17 to —60° F., with measured temperatures in the expansion cylinders themselves as low as 100° F. below zero. As the cooled wet gas was seldom at a pressure below 250 pounds, it is little wonder that excessive evaporation losses were experienced, especially when the product was universally stored in the ordinary atmospheric type of corrugated iron tank. Such plants were characterized by their frost covered lines, accumulators, engine cylinders and even storage tanks.

Types of Expander Units

Most of the expansion engines used were ordinary reciprocating steam units, such as compressors, pumps, and in a few instances, the conventional drilling engine. While most of these were single stage there were many installations using two-stage expansion. In the majority of cases the power developed in the expander cylinder by the adiabatic expansion of the dry gas was of secondary consideration. In most cases it was used simply to give resistance to the expanding gas, as in a plant where air was compressed to 40 pounds only to release it to the atmosphere through a small valve set to hold the required back pressure on the natural gas. In another plant the compressor of the expander unit held a vacuum on the dry gas side of the interchanger, and hence on the exhaust of the expander cylinder itself, allowing for a greater expansion range through the latter. The compressor delivered the gas at sufficient pressure to return it to the lease for fuel. This use of the power developed was not uncommon, although usually the compressor suction was above atmospheric pressure.

The troubles attendant with the operation of such machines were many, the principal one being the question of satisfactory lubrication at the exceedingly low temperatures of operation. These same low temperatures caused moisture in the gas to freeze within the machines, resulting even in disaster in some instances. In a few cases these difficulties were entirely overcome and the plant much simplified by the decided innovation of using a turbine as an expander unit. The power so developed was absorbed by direct connection to a centrifugal pump circulating cooling water for the plant. Such arrangement permitted the use of the lowest of temperatures, and as no internal lubrication is required with this type of machine, the problem of efficient lubrication was solved. It is a matter of surprise to us that the majority of plants did not avail themselves of this simple and effective solution of a troublesome feature.

Cooling by Means of Evaporation

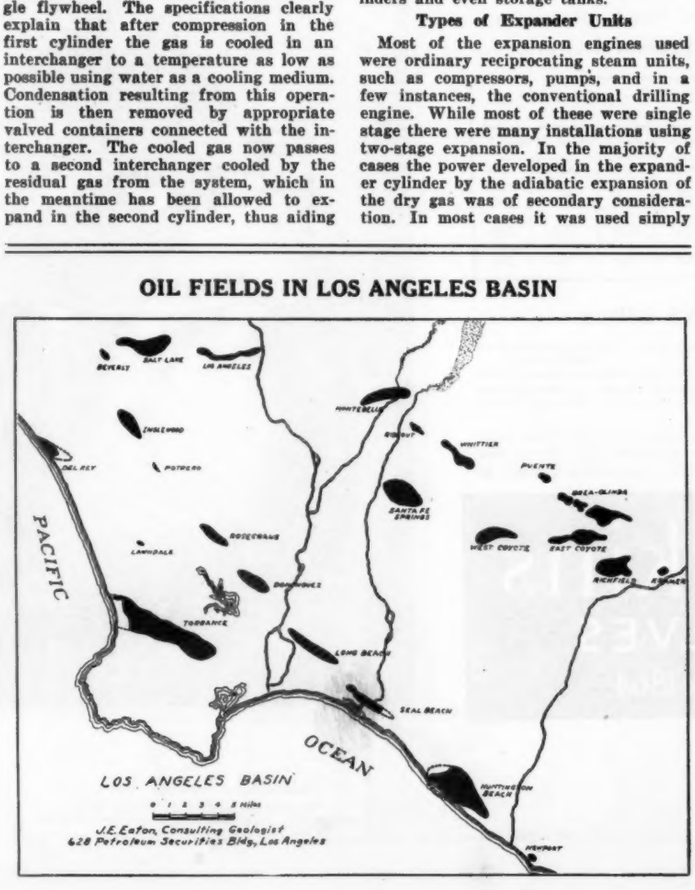
Because of the universal trouble arising from the use of expander units, F. E. Hosmer developed another method for obtaining the desired low temperatures. The process consisted in evaporating, under a partial vacuum, the gasoline produced in the high stage. This evaporation took place in a heat interchanger handling the wet incoming gas whereby the latter was lowered in temperature due to the evaporation of the lighter hydrocarbon fractions. The boiling off of the high stage gasoline in this manner is exactly analogous to the use of ammonia in the conventional compression system. The vaporized gasoline was rehandled through the circuit by the low stage machines along with the wet incoming gas to the plant. All in all, this method proved superior to the expander because of its greater heat extraction capacity, although it never was widely used because of the general decline in compressor plant installations in favor of the absorption system.

Refrigeration Gasoline Plants

In 1913, or about the time the first commercial absorption type of gasoline plant was built at Hastings, W. Va., there were already in operation a number of what might be termed straight refrigeration gasoline plants. One such plant consisted of a group of ordinary pipe coil exchangers, connected in series, through which the wet gas was pumped at a pressure of about 37 pounds. The temperature of this gas was progressively lowered by this means from 150° to 10° F., the resulting condensate being removed from each exchanger and combined to form a final product of 80 gravity. The three final exchangers served as ammonia evaporators in which the refrigerant was allowed to evaporate at 15 pounds, resulting in the final gas temperature of 10° F. This cold dry gas was then utilized in the first four exchangers for the initial cooling of the wet gas going to the evaporators. For producing this refrigeration the ammonia circuit required a 30-ton

(Continued on Page 115)

OIL FIELDS IN LOS ANGELES BASIN



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California Operators Made Records

Many New Methods and Improvements in Operating Procedure Developed in the Fields of the Western Coast

By L. P. Stockman

LOS ANGELES, Calif., Mar. 7.—If one were to write a history of petroleum in California, and dwelt only on the dramatic side, it would be replete with human interest and run through the entire gamut of human emotions. The basis of such a human interest story would be ambition and perhaps perseverance. The discovery of most fields in California can be attributed to selective drilling and perseverance, as records indicate very few have been discovered by the first hole drilled. Dominguez, Rosecrans, Long Beach, Seal Beach, Inglewood, Santa Fe Springs, Mount Poso and Kettleman Hills are outstanding examples of the failure to get commercial production in the first well drilled, as each of these fields required at least two holes before oil was discovered.

Perseverance alone is not synonymous with success. The Marathon Oil Co. drilled a well in Section 13-25-18, just east of one now being drilled by the Standard Oil Co. at Devils Den, but failed to develop production. This well was drilling off and on for 18 years before abandonment, thereby establishing a record of some kind for perseverance. Santa Fe Springs also required persistent exploratory work as it was years after the start that success crowned the efforts of operators. The Union Oil Co., discoverer of this field, started its first wildcat in 1907, about the time President Roosevelt was winding up his second term, but it was not until 15 years later that No. 1 Bell, recognized as the discovery well, was brought in. During this interval, the Union drilled and abandoned several tests on the Meyer lease, which subsequently was quitclaimed because of small unsatisfactory production.

Kettleman an Example

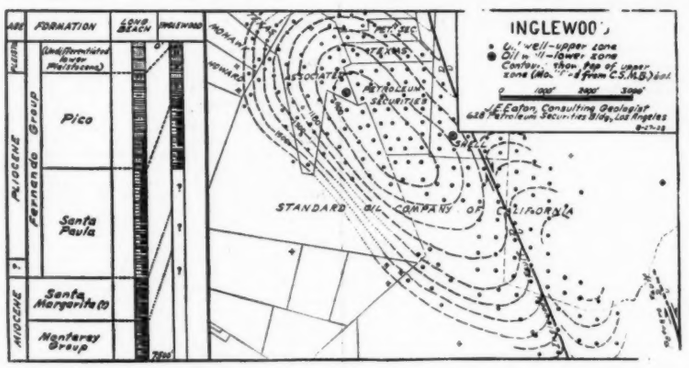
Kettleman Hills, the richest prize of all, lay undiscovered for years because none of the holes started was carried deep enough. The Milham Exploration Co., by remarkable perseverance in the face of great odds, finally tapped the pay. Persistent effort was required right up until the very last minute, as mechanical trouble developed just at the critical depth. The time spent fishing must have seemed like eternity to those watching the outcome, as approximately $250,000 had already been expended. Seal Beach was another field which defied discovery for a long time. The Shell's experiences in this district were rather unfortunate, but, at the same time, the company almost lost an additional $5,000,000, which it offered to the Hellman interests for a lease on the Hellman ranch. This property formed a topographic high, indicating the probable existence of a similarly located subsurface high. All major companies bid for this property but the Associated got it on a 50-50 deal. The Shell's operations in this district indicate how near and yet how far one can come to production and yet miss it. The Shell drilled several tests in this area, but ultimately pulled out because of the inability to exclude water. The Continental Oil Co., which received credit for discovery of the Seal Beach Field by finishing the first commercial producer, subsequently finished a 1,000-bbl. well within 500 feet of an unsuccessful test drilled by the Shell.

The rotary method of drilling, while it did not originate in California, was advanced to its present state of perfection under actual field work in this State. Practically all drilling in California is done with rotary equipment. This method has been used almost exclusively for a number of years because of its drilling speed, flexibility and other salient features. It is needless to say, of course, that the present type of rotary equipment is nothing like the original type, except in the fundamental basis consisting of rotary movement. Advancement has been made in practically every part of the equipment from the rotary table itself to the smallest piece of material used in the general assembly.

Use of Rotary

It is interesting to note in this connection that Frank F. Hill, manager of production for the Union Oil Co. of California, introduced the use of cement to the oil industry as a method of excluding water. Previously, various methods were used with varying success. The Union was the first company in California to use a rotary outfit in the drilling of wells. It was also the first company to use a steel derrick, embodying steel and concrete construction, in California. Within the past year the Standard and Union advanced the technique of drilling by utilizing direct current in electrically drilled wells in place of alternating current previously used. The Standard's installation used Diesel engines to generate current, while the Union relied on engine distillate to generate current for use in the company's portable rotary drilling equipment.

Several methods have been used in the drilling of wells with rotary equipment in California. The Union is responsible for the dry drill hole method of rotary drilling, which has not yet been perfected to the extent that it can be applied to general use. It is particularly adaptable to areas in which there is a lack of water, provided of course the formations are conducive to this type of work. It is the general practice to use fresh water in the drilling of rotary holes but the Union deviated from this policy in its operations at Playa Del Rey. Practically all wells drilled by the company in this field have utilized salt water drawn from a slough directly connected with the Pacific Ocean. This salt water, after being drawn in through a special intake, is circulated to each drilling well according to requirements, and after completing its immediate use is pumped from the drilling wells back into a central storage system where the drilling mud is settled out and the salt water, free of any impurities, is bled off into the slough from which it was originally received. Well cuttings and all abrasive material is removed by a centrifugal separator before the receipts from each well are pumped into the general receiving tank. The Standard Oil Co.'s contribution to the advancement of rotary drilling, in addition to other things, consists of the substitution of oil as the solvent for rotary mud in place of water. Experimental work along this line was conducted in the drilling of No. 105 Murphy in the West Coyote Field of Los Angeles Basin. The results were satisfactory, but this deviation from the usual method is advantageous only under certain favorable conditions.



Straight Hole Drilling

California operators were among the first to recognize the importance of straight hole drilling and were consequently responsible for the advancement made in the various methods for determination of drift in wells. The Union was one of the pioneers in advocating the drilling of straight holes, having conducted a series of actual tests several years ago. The company erected a miniature drilling outfit in the Dominguez Field of Los Angeles Basin and proceeded to test out its theories. Many of the blocks and material used in this test were exhibited last year at the first annual Oil Equipment and Engineering Exposition held in Los Angeles in March, 1930.

The necessity of drilling straight holes is generally recognized and as a consequence a number of methods have been perfected for the underground survey of wells to determine the amount of deviation from the vertical. Very few wells are drilled by competent operators without periodic surveys to determine the amount of deviation. The acid bottle has come back into general use and all progressive operators make constant use of it. The Union probably uses more acid bottles than any other single operator in the State at present. It is interesting to look back a few years and recall the arguments and discussions incident to the deviation of wells from the vertical. One early survey indicated a drift of 1,200 feet. Field men were definite in their statements that such a condition could not exist, holding that the stress on the drill pipe would not permit of such a condition. This tended to discredit the accuracy of the instruments until one bright morning two wells, located 500 feet apart, suddenly came together. Immediately operators began to take notice and this subject became quite important a short time later when drilling wells in the Long Beach Field began drilling through the casing of producing wells with frequent regularity. The Superior Oil Co. is probably pretty well sold on the advantages of straight hole drilling, following the drilling of two wells in the Santa Fe Springs Field when the recent deep zone exploitation was started. If this company had used acid bottles, or some other approved method to determine deviation from the vertical, it would have saved about 7,000 feet of hole and five or six weeks of lost time. The failure to drill straight holes forced the company to plug back these two wells at Santa Fe Springs to around the 1,000-foot level and begin drilling all over again.

Gas Lift

California operators, in addition to advancing the technique of drilling, also pioneered gas lift and repressuring operations. The Union was perhaps the first company to appreciate the advantages of gas lift and its initial installations on the Stearns lease at Fullerton and in the Richfield and Huntington Beach Fields represent the first major installations for the artificial stimulation of production by the introduction of natural gas. This work was supervised by A. C. Rubel and Francis W. Lake. Gas lift operations have increased by leaps and bounds with a resulting increase in production and a flattening out of decline curves. The Union was also aggressive in repressuring operations, having stored considerable gas in partially depleted zones at Brea Olinda, Santa Fe Springs, Dominguez, Santa Maria and Richfield.

In addition to storing natural gas in the earth, the Union has also stored approximately 300,000 bbls. of crude oil in the same way in the Brea Olinda and Santa Maria Fields. Both of the zones utilized were previously prepared by extensive injection of natural gas. Several tests made upon completion of oil and gas injection indicate maximum recovery. A number of wells in the Brea Olinda Field, which previously were small pumpers, were returned to production on preliminary tests flowing in excess of 2,000 bbls. per day. Subsurface storage of crude oil is only permissible under favor-

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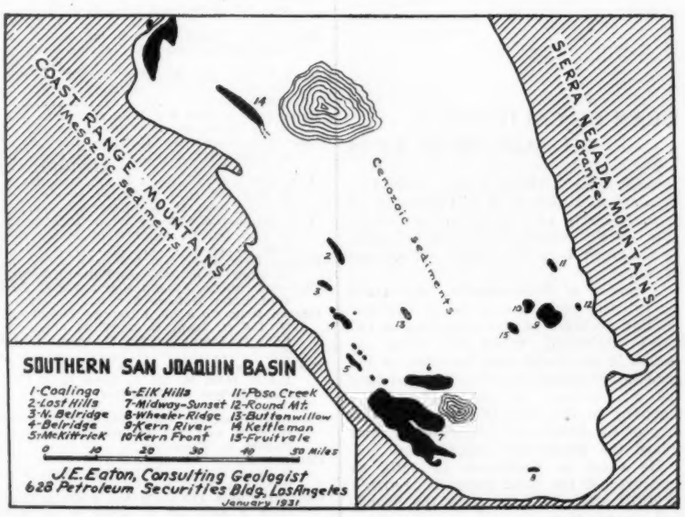


ROCKY MOUNTAIN AREA

(Continued from Page 51)

State which came in several years ago as a gasser. This hole may be made into a deep test. It had several shows of both oil and gas.

WYOMING

Natrona County

Midwest Refining Co.'s No. 11 Middy, C NE NE, Section 23-35-79, Midway Dome, on production for several months at a total depth of 5,215 feet, is being deepened below the second Wall Creek, in which a discovery was made last year. Cemented from 5,150 to 5,215 feet, it is standing while rotary is being rigged up. Meanwhile, the test on the Geary Dome will stand. The Midway well dropped to 60 bbls. a day. It was given two small shots which resulted in a slight increase for a few days only.

Converse County

Ohio Oil Co.'s No. 5 Jones, NW NE NE, Section 9-33-76, Big Muddy, an old well deepened to test the Dakota series, is in the top of the Dakota and coring at 4,280 feet. The cores show oil saturation, but a test failed to reveal any pressure.

Niobrara County

Argo Oil Co.'s No. 1 Elliott, NW cor., Section 5-35-65, Lance Creek, an old well being deepened, is bottomed at 3,100 feet and through the second Dakota. The pressure cleared the hole of drilling water. The flow of gas is estimated at 6,000,000 feet. It will be allowed to produce temporarily until the pressure goes down when drilling to the Lakota will be continued.

Fremont County

Producers & Refiners Corp.'s No. 10, SE NW SW, Section 14-32-95, Big Sand Draw, the deep test of all horizons down to and possibly into the Pennsylvanian, is coring gray sandy lime at 4,683 feet and reaming at 4,653 feet. The Texas Production Co.'s No. 1 State, SW SW, Section 36-34-95, Alkali Butte, is again held up by a fishing job at a total depth of 4,485 feet.

Park County

Resolute Oil Co.'s No. 1, NE SW NE, Section 17-57-101, Badger Basin, the deepest hole drilled in the Rocky Mountain area, is drilling at 8,340 feet in a 3½-inch hole. It had 14 feet of the first Wall Creek at 8,245 feet, which made 1,000,000 feet of gas and a small quantity of 45 gravity oil.

Big Horn County

Ohio Oil Co.'s No. 1 Smith, Lot 61, Section 33-56-97, Garland Dome, is drilling at 1,165 feet.

Washakie County

Ohio Oil Co.'s No. 1 Strothers, SW SE NW, Section 19-45-92, Neiber Dome, which is to be drilled to 7,000 and possibly 8,000 feet, is ready to spud. Noble Drilling Co. has the contract. It is a rotary operation.

MONTANA

Toole County

One new location in the Kevin-Sunburst Field was reported, United Petroleum Co.'s No. 8 Abell, SW SE SW, Section 25-35-2w, drilling at 400 feet.

A fire was reported in the Barthelote Field in the Liquid Gold Oil Co.'s No. 1 Roberts, C NW NE, Section 25-36n-1e, which encountered a flow of gas in a stray sand at 2,150 feet, 250 feet above where the Sunburst sand was expected. The 6¼-inch was set at 2,025 feet. The A-1 Petroleum Co.'s No. 1 Barthelote, SW SE NE, Section 24-36-1e, in the same district, is drilling at 1,350 feet.

Ashalta Oil Co.'s No. 1 Volbrecht, NE cor. SE, Section 11-37-4w, on the southwestern side of the Border Field, is bottomed at 2,460 feet and fishing for tools.

Choteau County

Williston-Shelby Oil & Gas Co.'s No. 1 Flack, NE cor. SE, Section 12-28n-11e, Big Sandy district, an old well which has been standing at 2,860 feet, has resumed. Underreaming is in progress to lower pipe to 2,860 feet where it will be set to shut off fresh water at 2,845 feet.

Liberty County

Western Natural Gas Co.'s No. 1 Poindexter, C SE SE, Section 17-37-4e, Whitlash district, is drilling at 1,495 feet, nearing the gas sand. It had a show of oil at 1,110 feet. Utopia Oil Co.'s No. 1 Eleanor, SE SE, Section 11-33-6e, Utopia district, is fishing at 3,214 feet.

Hill County

Jones-Rice-Perkins' No. 1 Dull, NE cor., Section 4-32-12e, Kremlin Dome, was completed in the Eagle sand at 1,090-1,150 feet with a production of 2,000,000 feet of gas with a pressure of 225 pounds.

Glacier County

Jeffries-Haire's No. 1 Dawson, SE cor. NE, Section 17-31-12w, Dawson district, is shut down temporarily at 3,050 feet.

Carbon County

Ohio Oil Co.'s No. 1 Souders, C SW SW, Section 2-7s-21, Dry Creek, is drilling at 1,047 feet, and its No. 1 Montana Industrial, SW NE, Section 11-7s-21, at 3,612 feet.

Rosebud County

Prairie Oil & Gas Co.'s No. 1-X, Contract 3, NE SW NW, Section 26-10-39, Porcupine Dome, is bottomed at 2,325 feet and drilling up underreamer lug, and its No. 1, Contract 4, SW SW, Section 28-11-39, is shut down at 1,360 feet.

Rocky Mountain Production

Average daily runs from fields week ending March 7:

WYOMING	
Salt Creek	26,570
Big Muddy	1,930
Byron	10
Cody	....
Dallas-Derby	640
Dutton Creek	130
Elk Basin	690
Ferris	20
Frannie	450
Grass Creek	28
Greybull	10
Hudson	420
LaBarge	2,030
Lance Creek	190
Lost Soldier	3,950
Lovell	10
Oregon Basin	1,540
Osage	800
Rock River	2,060
Poison Spider	290
South Casper	250
Teapot	20
Total Wyoming	42,030
MONTANA	
Buckley-Border	540
Cat Creek	1,060
Dry Creek	510
Kevin-Sunburst	4,240
Lake Basin	60
Pondera	1,620
Total Montana	8,030
COLORADO	
Florence	390
Fort Collins	1,030
Iles	970
Orchard	380
Moffat	1,040
Rangely	50
Tow Creek	350
Total Colorado	4,210
NEW MEXICO	
Rattlesnake	600
Hogback	470
Table Mesa	70
Artesia	836
Cap Rock	276
Getty	177
Hobbs	29,594
Jal	1,250
Lea	2,062
Eunice	1,526
Texas Pacific area	215
Total New Mexico	37,076
Total Rocky Mountains	91,346
Total previous week	98,613
Difference	7,267

DEAN OF CALIFORNIA OIL MEN DEAD AT 86

SAN FRANCISCO, Calif., Mar. 7.—William S. Miller, dean of California oil men, formerly vice president and chairman of the Standard Oil Co. of California, died here this week at the age of 86.

A native of Pennsylvania, he entered the railroad business as a young man and became manager of the Alleghany & Oil Creek Railroad. When the first air brakes in the world were installed on his road in the early seventies, he went into the oil business. In 1881 he sold his company to the Star Oil Co., a subsidiary of the Standard of New Jersey, and joined the Rockefeller organization.

He came to California in 1891 as treasurer of the local company, retiring in 1919 after 45 years with the Standard organization.

EAST CENTRAL TEXAS WILDCATS

(Continued from Page 65)

East Texas Refining Co. et al's No. 1 Fisher, 200 ft. N and 200 ft. W of E 98-ac. tract, John Ruddle Sur. ..... Wating on csg. 3,510 ft.

East Texas Ref. Co. et al's No. 1 B. Rodden, 200 ft. from N, 200 ft. from E of 32-ac. lease, 3,700 ft. from W, 6,400 ft. from N, William Robinson Sur. ..... Cored oil sand 3,572-77 ft.

D. H. Felder's No. 1 Elder (Trip), 200 ft. N and 200 ft. W of Elder tract, J. W. McCorry Sur. ..... Reaming hole 3,495 ft.

M. S. Hammond's No. 1 J. M. Hamby, 278 ft. from E line, 1,667 ft. S of Hamby 3,800-ac. tract, Martin Lant Sur. ..... Cored chalky shale 3,539-43 ft.

Hickman and Baird's No. 1 Maude Smith, 150 ft. from N and 160 ft. from E of 35-ac. tract, 3,200 ft. from W and 2,550 ft. from N of survey, Isaac C. Skillern Sur. ..... Spudding.

Hurburt and Brown's No. 1 L. L. Mackey, 990 ft. from E and 990 ft. from S of 269-ac. tract, 1,000 ft. from W and 990 ft. from S of survey, G. Y. Chambers Sur. ..... Rig up.

Hurburt and Brown's No. 1 A. J. Page, 1,670 ft. S and 2,080 ft. E of SW cor. of Ed Robinson Sur., James Dixon Sur. ..... Drlg. 2,980 ft.

Lewis Prod. Co.'s No. 1 D. M. Peterson, 150 ft. from S and 150 ft. from W of survey, G. S. Carthews Sur. ..... Derrick.

Leonard Pet. Co.'s No. 1 W. S. Pryor, 200 ft. from S and 200 ft. from W of 152-ac. tract, 2,600 ft. from E and 2,350 ft. from N of survey, Hamilton McNutt Sur. ..... Derrick.

Lloyd Oil Corp.'s No. 1 S. G. Andrews, 150 ft. fom S. 330 ft. from W of NW 50-ac. tract, 2 miles NW of Kilgore, W. M. F. Hyde Sur. ..... Shut down 2,665 ft.

Magnolia Pet. Co.'s No. 1 Ben Laird, 150 ft. from E and 150 ft. from S of survey, Isaac Ruddle Sur. ..... Rig up.

Magnolia Pet. Co.'s No. 1 B. Rodden, 200 ft. from N and 200 ft. from W of 42-ac. lease, 4,200 ft. from W and 6,200 ft. from N of survey, William Robinson Sur. ..... Drlg. 2,880 ft.; top Pecan Gap 2,411 ft.

Magnolia Pet. Co.'s No. 2 B. Rodden, 500 ft. NE and 200 ft. SE of NW cor. of 42-ac. lease, William Robinson Sur. ..... Rig up.

Marine Oil Co.'s No. 1 Art Mitchell, 150 ft. from E and 150 ft. from S of lease, 1,050 ft. from E and 800 ft. from S of survey, John S. Carithers Sur. ..... Drlg. 2,550 ft.

George McCamey et al's No. 1 J. F. Richards, 150 ft. from N and 150 ft. from W of 50-ac. tract, Mary Van Winkle Sur. ..... Shut down 3,473 ft.

Merren-Van Horn et al's No. 1 Maude Smith, 150 ft. from S, 150 ft. from W of 35-ac. tract and 10-ac. lease, 3,400 ft. from W and 2,800 ft. from N, Isaac C. Shelborn Sur. ..... Drlg. 2,643 ft.

Navarro Oil Co.'s No. 1 G. B. Tenery, 167 ft. from N and 150 ft. from W of farm and 10-ac. lease, 5,000 ft. from W and 4,550 ft. from N of survey, William Robinson Sur. ..... Drlg. 2,550 ft.

W. G. Ray Drlg. Co.'s No. 1 Maude Smith, 150 ft. from N and 150 ft. from W of tract, 1,200 ft. from W and 1,400 ft. from S of survey ..... Waiting on csg. 302 ft.

Foy Roberts et al's No. 1 L. M. Colburn, 150 ft. from E and 150 ft. from S of 45-ac. lease, 5,700 ft. from E and 850 ft. from N of survey, Henry Hathaway Sur. ..... Location.

C. Rosenfield et al's No. 1 J. A. Knowles, 700 ft. from E, 1,250 ft. from N, William Lyles Sur. ..... Rig up.

Jim Rusk et al's No. 1 G. B. Tenery, 110 ft. from N and 110 ft. from W of 10-ac. lease, 5,050 ft. from W and 49,010 ft. from N of survey, William Robinson Sur. ..... Rig up.

Selby Oil & Gas Co.'s No. 1 P. J. Snarley, 200 ft. from N and 200 ft. from E of survey, William Lyndale Sur. ..... Moving in material.

Simms and Stanolind Oil Co.'s No. 1 G. B. Tenery, 150 ft. from N and 150 ft. from W of 10-ac. lease, William Robinson Sur. ..... Rig up.

Smith Ref. Co.'s No. 1 J. A. Knowles, 150 ft. from S. 150 ft. from NW of 75-ac. tract, 5,200 ft. from W, 7,700 ft. from N, Mary Van Winkle Sur. ..... Derrick.

Sultan Oil Co.'s No. 1 J. F. Spangler, 330 ft. from E and 300 ft. from S of NE of 160-ac. tract, 2,600 ft. from E and 1,500 ft. from S of survey, G. W. Hooper Sur. ..... Drlg. 824 ft.

Paul Vitek et al's No. 1 Louise Osborne, 150 ft. from E, 150 ft. from S of W 46-ac. of 84-ac. tract, 2,000 ft. from W, 450 ft. from S, R. R. Bobbett Sur. ..... Derrick pattern.

Werbey and McMinn's No. 1 Solon King, 1,400 ft. from E and 3,300 ft. from S of survey, W. P. Chisum Sur. ..... Derrick.

Youngblood, trustee's No. 1 W. N. Lamp, 300 ft. from S and E of most northern NW cor. of tract, 5,800 ft. from W, 1,500 ft. from N, David Ferguson Sur. ..... Derrick pattern.

HENDERSON COUNTY

E. L. Chapman's No. 3 Cade, 1,650 ft. from N and 750 ft. W, J. B. Dorsey Sur. ..... Cored dry sand 5,051-56 ft.

HUNT COUNTY

Mamie S. Hammond's No. 1 W. H. Adams, center of survey, W of Branson Sur., J. A. McFarland Sur. ..... Derrick blew down.

LAMAR COUNTY

Everett & Allen's No. 1 Guest, 350 ft. S and 2,046 ft. E of 100-ac. tract, L. Roberts Sur. ..... Shut down 1,829 ft. for fuel.

RED RIVER COUNTY

Droppleman and Bunely's No. 1 J. W. Cunningham, 350 ft. E and 350 ft. S of 180-ac. tract, S. B. Shi Sur. ..... Shut down 2,741 ft.

Everett & Allen's No. 1 E. Howison, 225 ft. S, 185 ft. W of 79-ac. tract, William Humphreys Sur. ..... Derrick.

Everett & Allen's No. 1 Bryan, 1,200 ft. SW of NE cor. of Bryan 130 acres, P. Vaughn Sur. ..... Location.

KILGORE AREA—RUSK COUNTY

H. L. Blackstock's No. 1 W. P. Brightwell, 150 ft. from N and 150 ft. from E of 100-ac. tract and 10-ac. lease, Robert E. Winn Sur. ..... Rig up.

H. L. Blackstock's No. 2 W. R. Brightwell, 150 ft. from E and 150 ft. from S of lease, Robert E. Winn Sur. ..... Derrick.

Burton Drlg. Co.'s No. 1 Florey, 2,250 ft. from N, 150 ft. from W of SE cor., Peter Holmes Sur. ..... Cored oil sand 3,710-29 ft.

Burton Drlg. Co.'s No. 1 Clark, 172 ft. from E, 2,282 ft. S of Peter Holmes Sur. ..... Base Pecan Gap 3,070 ft.; drlg.

Burton Drlg. Co.'s No. 1 George Thompson, 150 ft. from N, 150 ft. from E of W 20 acres of 70-ac. tract, 1,600 ft. from E, 2,200 ft. from N, Robert E. Winn Sur. ..... Drlg. 2,200 ft.

Cordova Union Oil & Land Co.'s No. 1 C. O. Christian, 150 ft. from N, 171 ft. from W of Christiana 36-ac. tract, Robert E. Winn Sur. ..... Flowed 500 bbls. in 2 hrs. 10 minutes; T. D. 3,705 ft.

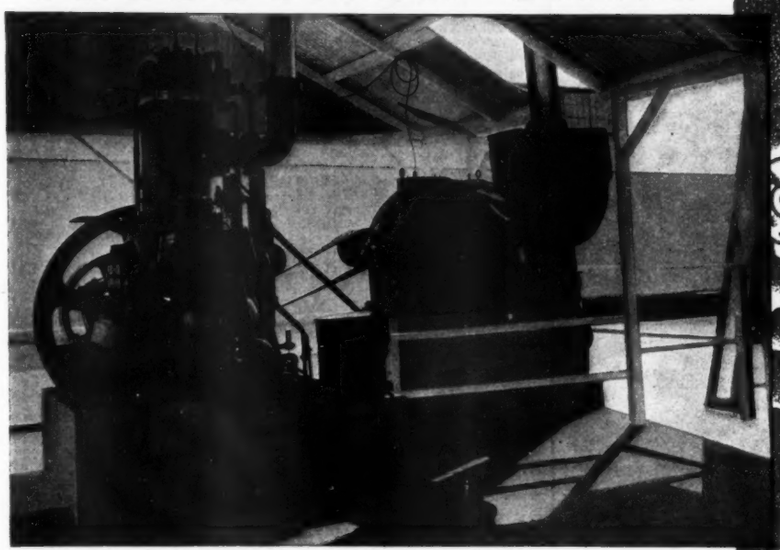
Cordova Union Oil Co.'s No. 2 C. O. Christian, 150 ft. from E and 150 ft. from S of lease and tract, Robert E. Winn Sur. ..... Rig up.

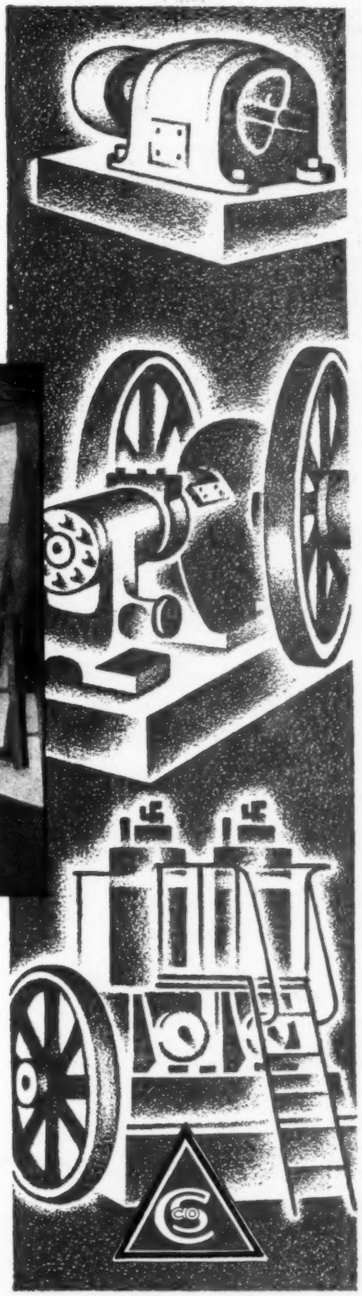
Cordova Union Oil Co.'s No. 3 C. O. Christian, 2,200 ft. from E line and 1,450 ft. from N line of survey, Robert E. Winn Sur. ..... Derrick.

Cordova Union Oil Co.'s No. 4 C. O. Christian, 750 ft. from S and 150 ft. from W of lease and tract, Robert E. Winn Sur. ..... Derrick.

EMSCO FALK

PRODUCTION UNITS





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CEP-1

CONTINENTAL

Cox and Haimon's No. 1 D. M. Peterson, 150 ft. from SE and NE lines of 41-ac. lease, 2,700 ft. from E and 3,350 ft. from N of Sur., Isaac Ruddle Sur. ..... Drlg. 1,960 ft.

Curtis and Lee's No. 1 J. S. Bean, 1,650 ft. from S, 200 ft. E of NW cor. of 214-ac. tract and lease, 4,925 ft. from S, 1,075 ft. from W, J. Lewis Sur. .... Set 148 ft. of 10-in

Elsy Drlg. Co.'s No. 1 J. M. Brightwell, 150 ft. from N, 150 ft. from E of 30-ac. tract, 1,150 ft. from E, 150 ft. from N, Robert W. Smith Sur. ..... Derrick.

Elsy Drlg. Co.'s No. 1 George Thompson, 150 ft. from N, 150 ft. from E of tract of 70 acres and 10-ac. lease, 400 ft. S, 500 ft. W, Henry Dobson Sur. ..... Derrick.

Federated Oil Co.'s No. 1 Laird, 150 ft. from S, 1,221 ft. from W of Laird 55-ac. tract, Isaac Ruddle Sur... Flowed 208 bbls. first hour; shut in; T. D. 3,664 ft.

Humble Oil & Ref. Co.'s No. 3 L. D. Crim, 2,428 ft. from E, 194 ft. S of Sevier Sur. ..... Top sand 3,655 ft.; testing.

Humble Oil & Ref. Co.'s No. 4 Lou Della Crim, 2,746 ft. W, 150 ft. from N of SE cor., E. G. Sevier Sur..... Cored 3,672-80 ft.; reaming.

Humble Oil & Ref. Co.'s No. 5 Della Crim, 3,120 ft. W, 150 ft. N of SE cor., E. G. Sevier Sur. ..... Drlg. 3,000 ft.; top Pecan Gap 2,646 ft.

Humble Oil & Ref. Co.'s No. 8 L. D. Crim, 4,468 ft. from E and 150 ft. from S of survey, E. G. Sevier Sur..... Derrick.

Humble Oil & Ref. Co.'s No. 9 L. D. Crim, 3,128 ft. from E and 150 ft. from S of survey, E. G. Sevier Sur. ..... Rig.

Humble Oil & Refining Co.'s No. 11 L. D. Crim, 585 ft. from E and 200 ft. from S of L. D. Crim 628-ac. tract, E. G. Sevier Sur. ..... Derrick.

Humble Oil & Refining Co.'s No. 10 L. D. Crim, 931 ft. from E and 200 ft. from S of L. D. Crim 628-ac. tract, E. G. Sevier Sur. ..... Derrick.

Humble Oil & Ref. Co.'s No. 1 Ben Laird, 150 ft. from N, 1,219 ft. from W of Laird 100-ac. tract, Isaac Ruddle Sur. ..... Waiting on csg. 3,598 ft.

Humble Oil & Ref. Co.'s No. 1-A J. N. Peterson, 254 ft. from SE and direct offset to Federated, 2,250 ft. from W, 2,300 ft. from S, Isaac Ruddle Sur. ..... Cored oil sand 3,616-35 ft.

Humble Oil & Refining Co.'s No. 3 Peterson, 120 ft. from E and 120 ft. from W, being 740 ft. N and 29° W of Peterson No. 1-B, 12-ac. tract, Isaac Ruddle Sur. ..... Location.

Humble Oil & Refining Co.'s No. 4 J. N. Peterson, 200 ft. S and 271 ft. W of NE cor. of Peterson 63-ac. tract, Isaac Ruddle Sur. ..... Derrick.

E. M. Jones et al's No. 1-A D. M. Peterson, 150 ft. from SW and SE lines of 206-ac. tract and 10-ac. lease, 3,600 ft. from W, 3,800 ft. from S, Isaac Ruddle Sur... Pulled in rig; moving over to start new hole.

E. M. Jones and Houston Oil Co.'s No. 1 W. R. Crim, 150 ft. from N and 150 ft. from E of 10-ac. lease, Robert E. Winn Sur. ..... Rig up.

Karona Oil Co.'s No. 1 J. N. Peterson, 150 ft. from N, 150 ft. from W of tract and 25-ac. lease, 1,200 ft. from W, 1,400 ft. from N, Robert E. Winn Sur. .... Flowed 1,408 bbls. 19 hrs.

La-Tex Gas Co.'s No. 1 Major Kennedy, 333 ft. from W of survey and 166 ft. from S line of Kennedy 100-ac. tract, Daniel Clark Sur. ..... Drlg. 3,025 ft.; shut in; T. D. 3,616 ft.

Lloyd Oil Corp. et al's No. 1 Nicey, 150 ft. from S, 300 ft. from W of 25-ac. tract, Thomas Obar Sur. ..... T. D. 3,203 ft.

Luling Oil & Gas Co.'s No. 1 Brightwell, 150 ft. from N, 150 ft. from W, Robert Winn Sur. ..... Top Pecan Gap 2,560 ft.; base Pecan Gap 3,063 ft.; T. D. 3,522 ft.

Magnolia Pet. Co.'s No. 1 W. R. Crim, 150 ft. from N, 187 ft. from E of 50-ac. tract, 2,600 ft. from E, 150 ft. from N, Robert E. Winn Sur. ..... Drlg. plug 3,692 ft.

Markham and Dunning's No. 1 W. R. Crim, 150 ft. from N and 150 ft. from W of 25-ac. lease, Robert E. Winn Sur. ..... Location.

H. V. Oliver and Brown Drlg. Co.'s No. 1 B. F. Hindman, 150 ft. from N, 150 ft. from E of 5-ac. tract, 850 ft. from E, 3,150 ft. from N, Robert Smith Sur... Derrick.

JOINER POOL—RUSK COUNTY

Alford et al's No. 1 W. L. Thrash, 1,102 ft. from N, 420 ft. from E of SE cor., B. Smith Sur. ..... Derrick.

Andrade et al's No. 1 Thrash, 520 ft. from E, 2,100 ft. from S of 78-ac. tract (J. Goodwin on map), M. J. Prue Sur. ..... Derrick.

Andrade et al's No. 2 Thrash, 520 ft. from E, 1,855 ft. from S of 78-ac. tract, M. J. Prue Sur. ..... Building derrick.

Andrade et al's No. 3 Thrash, 845 ft. from E, 1,775 ft. from S of 78-ac. tract, M. J. Prue Sur. ..... Derrick pattern.

Anderson's No. 2 Frederick, 50 ft. from S, 150 ft. from W of Frederick 35-ac. tract, Juan Ximenes Sur. .... Oil sand 3,591-92 ft., waiting on csg.

Anderson's No. 1 Thompson, 150 ft. from N, 150 ft. from E, M. J. Prue Sur. ..... Set 6⅝-in. csg. 3,635 ft.

G. S. Anderson's No. 1 Jobe, 150 ft. out of NW cor. of W 25 acres, Jobe tract, Juan Ximenes Sur. .... Fishing 1,861 ft.

G. S. Anderson's No. 2 Jobe, 150 ft. from N and 150 ft. from E of W 25-ac. tract, Juan Ximenes Sur. .... Rig up.

Babcock Bros.' No. 1 Camp, 150 ft. from N, 171 ft. from E of 4-ac. tract, Juan Ximenes Sur. ..... Drlg. 3,520 ft.; Top Pecan Gap 2,500 ft.; base Pecan Gap 2,960 ft.

Bahan's No. 1 W. M. Camp, 150 ft. from N, 150 ft. from W of 35-ac. tract, Juan Ximenes Sur. ..... Building derrick.

Ball and Malone's No. 2 Bradford, 6,100 ft. from S line and 225 ft. from W line of survey, Juan Ximenes Sur. ..... Spudding.

L. W. Calendar's No. 1 Alford, 446 ft. E and 393 ft. S of SW cor. of T. J. Moore Sur, I. G. Parker Sur. ..... Derrick.

Capp and Smith's No. 1 J. L. Cochrane, 150 ft. from E, 150 ft. from SE cor. of Cochrane tract, Jacob Roth Sur. ..... Coring 3,737 ft.; cored shale 3,691-3,737 ft.

Consolidated Oil Co.'s No. 1 Wm. Jobe, 150 ft. from N, 450 ft. from W of lease, S offset to Anderson's No. 1 Fredericks, Juan Ximenes Sur. ..... Drlg. 2,905 ft.; top Pecan Gap 2,514 ft.

Consolidated Oil Co.'s No. 2 Jobe, 3,800 ft. from W and 3,160 ft. from N of survey, Juan Ximenes Sur. ..... Rig up.

Consolidated Oil Co.'s No. 3 Jobe, 4,500 ft. from W and 3,160 ft. from N of survey, Juan Ximenes Sur. ..... Rig up.

Consolidated Oil Co.'s No. 4 Jobe, 5,025 ft. from W and 3,160 ft. from N of survey, Juan Ximenes Sur. ..... Rig up.

Consolidated Oil Co.'s No. 5 Jobe, 243 ft. from S and 1,970 ft. from W of lease, 5,600 ft. from W and 3,160 ft. from N of Survey, Juan Ximenes Sur. .... Derrick pattern.

Consolidated Oil Co.'s No. 2 W. M. Camp, 150 ft. from N, 880 ft. from W of Camp 30-ac. tract, S offset to Foster's No. 1 Camp, Juan Ximenes Sur. ..... Drlg. 2,795 ft.; top Pecan Gap 2,595 ft.

E. L. Chapman's No. 1 A. P. Finney, 150 ft. from W of E 20 acres of 102-ac. tract, Isaac G. Parker Sur..... Derrick.

Cranfill & Reynolds' No. 1 Calvin Young, 275 ft. from E, 1,780 ft. from S of Young 300-ac. tract, M. J. Prue Sur. ..... Drlg. 2,752 ft.; top Pecan Gap 2,712 ft.

Dave & Bill Oil Co.'s No. 1 Calvin Young, 150 ft. from E, 1,485 ft. from S of Young tract, N of Lide's No. 1 Young, M. J. Prue Sur. ..... Drlg. 2,820 ft.; top Pecan Gap 2,710 ft.

George Demonstrend's No. 1 J. A. Bridwell, 150 ft. N, 150 ft. E of Bridwell E 73-ac. tract, M. J. Prue Sur... T. D. 2,426 ft.

Dan Dillion et al's No. 1 W. H. Frederick (Jake), 150 ft. from E, 150 ft. from S of 50-ac. tract, Juan Ximenes Sur. ..... Derrick.

East Texas Oil Co.'s No. 1 C. D. Ashby, 856 ft. N, 1,774 ft. from W of Ashby 119-ac. tract, Juan Ximenes Sur. ..... Shut down 1,950 ft.

East Texas Ref. Co.'s No. 1 C. C. Giles, 502 ft. from E, 300 ft. from S of 79-ac. tract in M. J. Prue Sur. .... Drlg. 2,110 ft.

Elsy Drlg. Co.'s No. 1 W. M. Camp., 150 ft. from N, 171 ft. from E of Camp. 28-ac. tract, Juan Ximenes Sur. ..... Drlg. 2,647 ft.; top Pecan Gap 2,520 ft.

Federated Oil Co.'s No. 2 Mayfield-Alford, 200 ft. from E, 200 ft. from S of lease on 105-ac. farm, 5,650 ft. from N and 2,600 ft. from W, Juan Ximenes Sur.. Drlg. 3,050 ft.

Federated Oil Co.'s No. 1 Camp, 150 ft. from S and 150 ft. from W of Camp 61-ac. farm, Juan Ximenes Sur. ..... Drlg. 2,710 ft.; top Pecan Gap 2,580 ft.; base Pecan Gap 3,010 ft.

Federated Oil Co.'s No. 2 Camp, 150 ft. from E and 150 ft. from S of 15-ac. lease, Juan Ximenes Sur. .. Drlg. 2,586 ft.

Foster and Deep Rock Oil Co.'s No. 1 Holland, 760 ft. from W and 4,760 ft. from N of survey, Juan Ximenes Sur. ..... Location.

Foster and Deep Rock Oil Corp.'s No. 2 Ashby, 150 ft. W, 45 ft. S of Aiken & Rayzor's No. 1 Ashby, Juan Ximenes Sur. ..... Top Pecan Gap 2,641 ft.; base Pecan Gap 3,032 ft.; T. D. 3,608 ft.

Foster and Deep Rock Oil Co.'s No. 2 Camp, 150 ft. from N and 150 ft. from E of lease, 300 ft. NE of No. 1, Juan Ximenes Sur. ..... Drlg. 2,125 ft.

Frank Foster and Little's No. 1 Mayfield-Alford, 150 ft. from N and 150 ft. from W of 45-ac. lease, Juan Ximenes Sur. ..... Rig up.

Frank Foster and Little's No. 2 Mayfield-Alford, 150 ft. from N and 150 ft. from E of 4.5-ac. lease, Juan Ximenes Sur. ..... Derrick.

Foster and Deep Rock Oil Corp.'s No. 3 Ashby, 150 ft. from S, 200 ft. from W of lease, Juan Ximenes Sur. Drlg. 1,965 ft.

Foster & Kolp's No. 2 Mayfield-Alford, 150 ft. from E, 150 ft. from S of lease, about 1,200 ft. from W line and 150 ft. from S line of Mayfield-Alford 105-ac. tract, Juan Ximenes Sur. ..... Waiting on csg. 3,590 ft.

Haynes Drlg. Co.'s No. 3 Brown, 150 ft. from S, 150 ft. from W of lease, M. J. Prue Sur., Juan Ximenes Sur. ..... Fishing 2,792 ft.; top Pecan Gap 2,702 ft.

Haynes Drlg. Co.'s No. 4 Brown, 150 ft. from N, 150 ft. from W, M. J. Prue Sur. ..... Drlg. 2,320 ft.

Hefflin et al's No. 1 Thrash, 150 ft. from S, 150 ft. from W of 78-ac. tract, M. J. Prue Sur. ..... Drlg. 2,840 ft.; top Pecan Gap 2,720 ft.

H. L. Hunt's No. 1 Camp, 4,625 ft. from W and 3,880 ft. from N of survey, Juan Ximenes Sur. ..... Drlg. 1,500 ft.

Hunt's No. 2 Bradford, 1,320 ft. from E, 150 ft. from S of Blk. No. 12, Juan Ximenes Sur. ..... Will standardize and drill deeper; T. D. 3,583 ft.

H. L. Hunt's No. 5 Ashby, 5,500 ft. from W and 8,900 ft. from S of survey, Juan Ximenes Sur. ..... Drlg. 2,693 ft.; top Pecan Gap 2,580 ft.

Jones Drlg. Co.'s No. 1 Thrash, 660 ft. from N, 154 ft. from S of SE cor. of J. T. Brown 76.93-ac. tract, 600 ft. from S and 3,200 ft. from E of Sur., M. J. Prue Sur. ..... Rig up.

K. & M. Oil Co.'s No. 1 Lum Taliaferro, 150 ft. from N and 1,092 ft. of Taliaferro 52-ac. tract, Juan Ximenes Sur. ..... Derrick.

E. C. Laster's No. 1 Daisy Bradford, 150 ft. from E, 150 ft. from S of Lot 14, Juan Ximenes Sur..... Waiting on csg. 3,487 ft.

E. C. Laster et al's No. 1 R. B. Gray, 1,650 ft. N, 2,425 ft. from E of B. B. Gray 228.25-ac. tract, McLain Sur. ..... Waiting on csg. 3,487 ft.

Lide-Rowe Oil Co.'s No. 1 Calvin Young, 150 ft. from E, 2,690 ft. from S of Young 393-ac. farm, M. J. Prue Sur. ..... Spudding.

Peter Lively et al's No. 1 Cox, 200 ft. N and 155 ft. W of SW cor. of T. L. Moore Sur., R. H. Pinney Sur. ..... Derrick.

John Mabee's No. 1 A. Thrash, 1,550 ft. from W and 3,150 ft. from the N line of survey, Juan Ximenes Sur. ..... Drlg. 2,800 ft.

Mid-Kansas Oil & Gas Co.'s No. 1 Moore, 150 ft. from N, 162 ft. from E of Moore 200-ac. tract, M. J. Prue Sur. ..... Drlg. 2,647 ft.

Mass et al's No. 1 Matthews, 3,344 ft. from N, 4,356 ft. from E. Dalines Cartimas Sur. ..... Drlg. 2,700 ft.

Moss & Urschel's No. 1 Mayfield-Alford, 221 ft. from S, 200 ft. from W of 10-ac. lease, Juan Ximenes Sur. ..... Will standardize; T. D. 3,620 ft.

Moss and Urschell's No. 2 Mayfield-Alford, 211 ft. from S and 790 ft. from W of lease, Juan Ximenes Sur. ..... Moving in material.

Merrick Oil Co.'s (Gibson & Johnson) No. 1 Ashby, 125 ft. from E, 135 ft. from S of Ashby 45-ac. tract, Juan Ximenes Sur. ..... Drlg. 2,910 ft.; top Pecan Gap 2,667 ft.

Merritt et al's No. 1 Cooper, 155 ft. from E and 170 ft. from S of most easterly SE cor. of T. J. Moore Sur. ..... Derrick.

Nat Saddler's No. 1 Ed Sparks, 350 ft. from E, 150 ft. from S of Sur., L. C. Riggs Sur. ..... Shut down 650 ft.

Olsen Bros.' No. 1 Brown, 300 ft. from N, 300 ft. from W of Olsen Bros.' No. 1 Brown, M. J. Prue Sur..... Cored oil sand 3,694-3,710 ft.; flowed 1,330 bbls. in 14 hrs. pinched.

Olsen Bros.' No. 2 Brown, 150 ft. from S, 150 ft. from E of 76.93-ac. tract, 4,900 ft. from N and 1,750 ft. from E of lease, M. J. Prue Sur. ..... Drlg. 2,265 ft.

Olsen Brothers' No. 3 Brown, 340 ft. S along W line of T. J. Brown 76-ac. from NW cor. of same and 200 ft. E at right angles to W line of M. J. Prue Sur. ..... Location.

Pearl Oil Co.'s No. 1 D. W. Eaton, 975 ft. from most southerly S line of middle tract and 400 ft. from W line of Francisco Cordova Sur. ..... Shut down 750 ft.

Petroleum Marketing Co.'s No. 1 Arnold, 350 ft. from E and 2,100 ft. from S of survey, M. J. Prue Sur. ... Drlg. 2,642 ft.

Petroleum Marketing Co.'s No. 1 Deason, 1,200 ft. from S line and 1,800 ft. from E line of survey, M. J. Prue Sur. ..... Drlg. 3,079 ft.

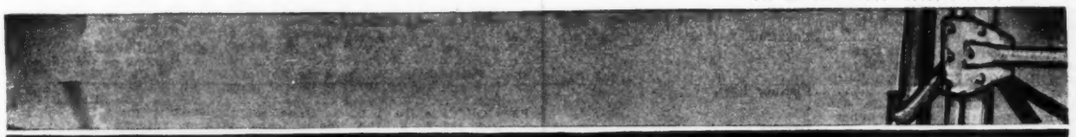
Petroleum Marketing Co.'s No. 1 Frederick, 5,100 ft. from W and 600 ft. from N of survey, Juan Ximenes Sur. ..... Drlg. 1,600 ft.

A. W. Phillips' No. 1 Deason, 540 ft. from E and 550 ft. from S of D. F. and A. J. Deason tract, Juan Ximenes Sur. ..... Derrick.

Pioneer Oil Co.'s No. 1 Taliaferro, 300 ft. from W and 3,200 ft. from N of survey, Juan Ximenes Sur. .... Derrick.

Pioneer Oil Co.'s No. 1 Thrash, 1,400 ft. from E line and 4,400 ft. from S line of survey, M. J. Prue Sur. ..... Waiting on csg.

Pioneer Oil Co.'s No. 3 Thrash, 1,275 ft. N along E line of A. Thrash 71-ac. tract from SE cor. of same and 485 ft. W at right angles to E line, M. J. Prue Sur. ..... Derrick.



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Bulletin 840 describes The Giant Six, 275-325 hp. Oil Field Drilling Engine. Send for it today. Waukesha Motor Company, Waukesha, Wis.

WAUKESHA ENGINES....

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Pioneer Oil Co.'s No. 2 Thrash, 5,850 ft. from S and 1,900 ft. from E of survey, M. J. Prue Sur. ..... Rig up.
Pioneer Oil Co.'s No. 4 Thrash, 1,900 ft. from E and 4,725 ft. from S of survey, M. J. Prue Sur. ..... Location.
Pioneer Oil Co.'s No. 5 Thrash, 1,900 ft. from E line and 5,025 ft. from S line of survey, M. J. Prue Sur. ..... Derrick.
Robertson Drlg. Co.'s No. 1 Deason, 3,400 ft. from S and 1,800 ft. from W of survey, Juan Ximenes Sur. ..... Rig up.
Robert's No. 1 School Land, center of 4-ac. school tract on the middle S line between Gates 70-ac. and Selman 72-ac. tracts, M. J. Prue Sur. ..... Location.
Rusk County Oil Co.'s No. 1 Robertson, 150 ft. from N along W line of George Guthrie Sur. from SE cor., 150 ft. W of E line of Robertson 20-ac. tract, R. H. Pinney Sur. ..... Fishing 1,285 ft.
J. Rusk et al's No. 1 W. B. Thompson, 150 ft. out of SW cor. of 59-ac. Thompson tract, John Dougherty Sur. ..... Derrick.
Shaw Oil Co.'s No. 1 Robertson, 1,780 ft. from W and 3,050 ft. from S of survey, Juan Ximenes Sur. ..... Rig up.
Shaw Oil Co.'s No. 1 Thrash, 3,200 ft. from the E line and 6,000 ft. from the S line of survey, M. J. Prue Sur. ..... Drlg. 3,236 ft.
Shaw Oil Co.'s No. 2 Ashby, 300 ft. from S, 325 ft. from W of 45-ac. tract, and 15-ac. strip lease, Juan Ximenes Sur. ..... Waiting on csg. 3,629 ft.
Sinclair Oil & Gas Co.'s No. 1 Daisy Bradford, 150 ft. from N and 150 ft. from E of Daisy Bradford 35-ac. lease, Juan Ximenes Sur. ..... Building derrick.
Sinclair Oil & Gas Co.'s No. 1 Holland, 150 ft. from S, 197 ft. W of 50-ac. tract, Juan Ximenes Sur. ..... Will deepen; T. D. 3,649 ft.
Sinclair Oil & Gas Co.'s No. 3 Holland, 200 ft. from E, 200 ft. from S of 50-ac. lease and 105-ac. tract, Juan Ximenes Sur. ..... Testing 3,613-95 ft.; 60 bbls. first hr.
Sinclair Oil & Gas Co.'s No. 4 Holland, 558 ft. from E, 197 ft. from S of 50-ac. lease and 105-ac. tract, Juan Ximenes Sur. ..... Drlg. 3,560 ft.
Sinclair Oil & Gas Co.'s No. 5 Holland, 200 ft. from N and 200 ft. from W of 50-ac. lease, Juan Ximenes Sur. ..... Derrick.
Sinclair Oil & Gas Co.'s No. 6 Holland, 450 ft. from N and 200 ft. from E of 50-ac. lease, Juan Ximenes Sur. ..... Derrick.
Sinclair Oil & Gas Co.'s No. 7 Holland, 925 ft. from E and 150 ft. from S of lease, Juan Ximenes Sur. ..... Location.
Tennant, receiver's No. 1 Harvey Brooks, 1,200 ft. from N, 150 ft. from W of Brooks 176-ac. tract, M. J. Prue Sur. ..... Drlg. 3,346 ft.
E. R. Tennant's No. 2 Brooks, 1,900 ft. from E and 6,500 ft. from S of survey, M. J. Prue Sur. ..... Waiting on csg. 104 ft.
E. R. Tennant's No. 2 Bradford, 6,720 ft. from N and 1,900 ft. from W of survey, Juan Ximenes Sur. ..... Building derrick.
E. R. Tennant's No. 3 Bradford, 1,890 ft. from W and 6,850 ft. from S of survey, Juan Ximenes Sur. ..... Location.
Tidal Oil Co.'s No. 2 Holland, 150 ft. from N and 197 ft. from E of lease, Juan Ximenes Sur. ..... Derrick.
Turman Oil Co.'s No. 1 Deason, 770 ft. from N, 150 ft. from W of 50-ac. tract, M. J. Prue Sur. ..... Drlg. 2,375 ft.
Turman Oil Co.'s No. 2 Deason, 150 ft. from N and 150 ft. from W of 50-ac. Deason tract, M. J. Prue Sur. ..... Waiting on casing.
Vitek's No. 1 Jobe, 2,950 ft. from W and 3,260 ft. from N of survey, Juan Ximenes Sur. ..... Derrick.
Warner-Quinlan's No. 1 Camp, 197 ft. from N, 271 ft. from W of Mrs. C. Long 3-ac. lease, Juan Ximenes Sur. ..... Cored oil sand and shale 3,602-58 ft.; running tubing.
West Texas Oil & Ref. Co.'s No. 1 John Tolly, 150 ft. from N and 150 ft. from E of 11-ac. tract, Juan Ximenes Sur. ..... Spudding.
Witherspoon et al's No. 1 Daisy Bradford, 200 ft. from S of N line, 1,500 ft. E of W line of Bradford 23-ac. lease, Juan Ximenes Sur. ..... Rig up.

SMITH COUNTY

Big Indian Oil Co.'s No. 1 Mills, 1,045 ft. E along S line of C. Mills 67.8-ac. farm, SW cor. of same and 710 ft. N at right angles to S line of 67.7 acres, J. Jordan Sur. ..... Derrick.
Howard Petroleum Co.'s No. 1 Lee Holt estate, 6,000 ft. from N and 1,000 ft. from S of survey, Barnes Clark Sur. ..... Location.
Guy V. Lewis' No. 1 S. S. Cooke, 150 ft. from E and 150 ft. from S of Cooke 58.5-ac. tract, J. Jordan Sur. ..... Drlg. 2,800 ft.
Thayer & Rogers' No. 1 Willingham, 150 ft. N and W of 14.5-ac. tract, Jacob Hernin Sur. ..... Shut down 3,400 ft.
Winona O. & G. Co.'s No. 1 Freeman, 150 ft. from S, W of 89-ac. tract in A. J. Legrone Sur., 4 miles SE of Winona ..... Shut down 3,661 ft.

UPSHUR COUNTY

D. Armand et al's No. 1 Marshall Fluellan, 450 ft. from N and 450 ft. from E of W 50 acres of S 100 acres of Fluellan 417-ac. farm, Marshall Mann Sur. ..... Drlg. 1,700 ft.

VAN ZANDT COUNTY

T. Daniels' No. 1 Fannie Cumbine, 185 ft. S and 175 ft. E of NW cor. 156-ac. tract, John Wright Sur. ..... Temporarily abandoned.
Dennis Oil Co.'s No. 1 C. W. Morris, 100 ft. from N and 300 ft. from E line of Morris 160-ac. tract in C. L. Morris Sur., 5 miles SE of Ben Wheeler ..... Temporarily abandoned.
J. C. Fare's No. 1 P. S. Hand, C of Hand's 50-ac. tract, William Shuman Sur. ..... Fishing 5,160 ft.
H. Helms et al's No. 1 Bogue, 647 ft. W and 155 ft. S of SE cor. of J. M. Brown 70-ac. in Marshall University Sur., SE of Van ..... Shut down 3,098 ft.
Humble Oil & Ref. Co.'s No. 1 L. A. Dowdle, 1,037 ft. N of S line and 150 ft. E of W line, William Daniel Sur. ..... Temp. abnd. 2,987 ft.
Imperator Oil Co.'s No. 2 G. W. Carter, 175 ft. from S and 35 ft. from W of G. W. Carter 171-ac. tract, William Daniel Sur. ..... Shut down.
Kelly Oil & Gas Co.'s No. 1 Lemsford, center of Lemsford tract, John Conner Sur. ..... Shut down 2,300 ft.
Neil McMehory's No. 1 R. V. Murphy, 150 ft. from N and 150 ft. W of survey, H. Bailey Sur. ..... Shut down 263 ft.
Pure Oil Co.'s No. 5, 200 ft. E of W line and 250 ft. N of S line of Tract No. 3, John Walling Sur. ..... Location.
Pure Oil Co.'s No. 3 R. E. Cade, 200 ft. W of E line and 250 ft. N of S line of lease, John Walling Sur. ..... Location.
Pure Oil Co.'s No. 3 R. E. Cade, 547 ft. N of S line and 225 ft. E of W line of lease, A. McPhail Sur. ..... Location.
Pure Oil Co.'s No. 3 A. G. Tunnell, 250 ft. N of S line and 200 ft. W of E line, John Walling Sur. ..... T. D. 2,942 ft.; testing; shut in.
Pure Oil Co.'s No. 6 A. R. Tunnell, 203 ft. N of N line of A. D. Clark 2-ac. tract and 150 ft. W of E line of lease, John Walling Sur. ..... Location.
Pure Oil Co.'s No. 1 Davis, 127 ft. from S and 200 ft. from W of 139-ac. tract, Nacogdoches County School Land ..... Derrick standing.
Pure Oil Co.'s No. 4 W. F. Swain, 250 ft. S of N line and 200 ft. W of E line of lease, Mund Gross Sur. ..... Derrick.
Pure Oil Co.'s No. 2 J. D. Miller, 250 ft. N of S line and 250 ft. E of W line of lease in John Walling Sur. ..... Running liner 2,933 ft.
Pure Oil Co.'s No. 6 W. T. Jarman, 344 ft. W of E line and 250 ft. S of N line of 8-ac. tract, Nacogdoches County School Lands ..... Shut in 2,942 ft.; testing.
Pure Oil Co.'s No. 7 Jarman, 250 ft. S of N line and 250 ft. E of W line of 8-ac. tract, Nacogdoches County School Land ..... Location.
Pure Oil Co.'s No. 9 A. D. Clark, 200 ft. W of E line and 495 ft. S of N line of lease, John Walling Sur. ..... Shut in 2,916 ft.; testing.
Pure Oil Co.'s No. 12 R. L. Wells, 250 ft. S of N line and 744 ft. E of W line of lease, H. V. Moore Sur. ..... Coring 2,762 ft.
Pure Oil Co.'s No. 4 O. L. Swain, 250 ft. W of E line and 647 ft. N of S line of lease, John Walling Sur. ..... Coring 2,775 ft.
Shell Pet. Corp.'s No. 9 E. L. Fowler, 203 ft. N of S line and 150 ft. W of E line of lease, John Walling Sur. ..... Coring 2,919 ft.
Pure Oil Co.'s No. 1 R. A. Enas, 835 ft. E of W line and 150 ft. S of N line of lease, Jackson Thomas Sur. ..... Ready to swab in 2,940 ft.
Pure Oil Co.'s No. 3 Ella York, 250 ft. S of N line and 250 ft. E of W line, John Walling Sur. ..... Shut down 2,455 ft.
Pure Oil Co.'s No. 1 Frank Blackstock, 85 ft. N of S line and 200 ft. E of W line of lease, John Walling Sur. ..... Preparing to abandon 2,990 ft.
Pure Oil Co.'s No. 10 J. T. Thompson, 150 ft. E of W line and 142 ft. N of N line of Van Methodist Church, Mund Gross Sur. ..... Location.
Roy Stumpff's No. 1 Riggs, 169 ft. from E and 155 ft. from S of 3-ac. tract, Walliam Daniel Sur. ..... Derrick (rotary).
Sun Oil Co.'s No. 2 T. J. Wallace, 250 ft. S of N line and 250 ft. W of E line of lease, John Walling Sur. ..... Coring 2,660 ft.
Van Oil Association's No. 1 Tankersley, 200 ft. from E and 1,000 ft. from S of farm, L. Landers Sur. ..... Shut down 1,028 ft.
Vitek Oil Co.'s No. 1 Smith, 150 ft. S and 15 ft. from W of L. A. Smith 40-ac. farm in John Walling Sur. ..... Derrick.
Wilson et al's No. 1 Stribling, 1,563 ft. W of E line and 800 ft. S of N line of M. B. Fisher 172-ac. in Phillips Mason Sur. ..... Shut down 1,590 ft.

WOOD COUNTY

Loche & Clark's No. 1 A. C. Pick, 165 ft. S of NE cor. G. C. Reeves 25-ac. tract, Daniel Fuller Sur. ..... Shut down 997 ft.

WILDCAT OPERATIONS IN TEXAS PANHANDLE

(Continued from Page 68)

Brown et al's No. 1 Duncan, 330 ft. S and E, NW, Sec. 93, Blk. 3, I.&G.N. Sur. ..... S.D. 740 ft.
Champlin's No. 3 McLaughlin, 1,650 ft. N, 990 ft. E, H.&G.N. Sur.; (old well drilled deeper), Sec. 33, Blk. B-2 ..... T.D. 2,855 ft.
Danciger O. & R. Co.'s No. 1 Sullivan, 231 ft. N, 224 ft. W, of E 160 ac. of S 264 ac., N½, Sec. 136, Blk. 3, H.&G.N. Sur. ..... Standardising 2,850 ft.
Danciger O. & R. Co.'s No. 1 Barnett, 231 ft. S, 330 ft. W, E½ of N 56 ac., Sec. 136, Blk. 3, I.&G.N. Sur. ..... S.D. 2,996 ft; S.G; to drill in.
Danciger O. & R. Co.'s No. 2 Sullivan, 231 ft. N, 884 ft. W of E 160 ac. of S 264 ac., N½, Sec. 136, Blk. 3, H.&G.N. Sur. ..... S.D. 3,351 ft.
Empire G. & F. Co.'s No. 3 Wall, 990 ft. S and W, NW, Sec. 161, Blk. 3, I.&G.N. Sur. ..... U.R. 8-in. csg. 2,350 ft.
Hurst et al's No. 1 Ayres, 330 ft. S and E, Sec. 76, Blk. 3, I.&G.N. Sur. ..... Rotary rig.
Jean Pet. Co.'s No. 1 Furneaux Bros., 330 ft. N and W, cor. SE, Sec. 200, Blk. B-2, H.&G.N. Sur. ..... S.D. 2,770 ft.
Kewanee O. & G. Co.'s No. 1-D Morse, 330 ft. N and W, S½ SW, Sec. 16, Blk. A-9, H.&G.N. Sur. ..... Drlg. 1,605 ft.
Kewanee O. & G. Co.'s No. 1 Morse, 330 ft. N and E, S½ SE, Sec. 15, Blk. 9-A, H.&G.N. Sur. ..... Drlg. 925 ft.
Kewanee O. & G. Co.'s No. 3 Smith, 330 ft. N and W, Sec. 149, Blk. 3, I.&G.N. Sur. ..... Drlg. 3,035 ft.
Magnolia Pet. Co.'s No. 1 Barrett, 330 ft. S and E, NE, Sec. 112, Blk. 3, I.&G.N. Sur. ..... Drlg. 900 ft.
Magnolia Pet. Co.'s No. 4 Latham, 300 ft. N, 820 ft. E, Sec. 153, Blk. 3, I.&G.N. Sur. ..... Rig up standard tools 2,345 ft.
Magnolia Pet. Co.'s No. 1 Eddington, 330 ft. N, 370 ft. E, NE, Sec. 34, Blk. B-2, H.&G.N. Sur. ..... To set 6-in. csg. after 8-in. collapsed at 2,625 ft.
Magnolia Pet. Co.'s No. 1 Morse, 330 ft. N and W, S½ NE, Sec. 5, Blk. 26, H.&G.N. Sur. ..... S.D. 2,631 ft.
McIlroy Oil Co.'s No. 1 Baer, 330 ft. S and W, Sec. 125, Blk. 3, I.&G.N. Sur. ..... Drlg. 2,950 ft.
Nelson et al's No. 1 Crewa, 330 ft. S and E, NW, Sec. 12, Blk. 25, H.&G.N. Sur. ..... Fishing for bit; T.D. 2,620 ft.
Operators Royalty & Prod. Co.'s No. 2 Vanniman, 330 ft. S and W, E½ NE, Sec. 175, Blk. 3, I.&G.N. Sur. ..... Set 8-in. csg. 2,787 ft.
Sanders et al's No. 1 Wright, 330 ft. S, 114 ft. E, Sec. 12, Blk. 3, I.&G.N. Sur. ..... Drlg. 392 ft.
W. A. Scott's No. 1 Cobb, 330 ft. S, 425 ft. W, N½ SE, Sec. 184, Blk. 3, I.&G.N. Sur. ..... Top pay 3,435 ft.
Skelly O. & G. Co.'s No. 1 Henston, 330 ft. N, 330 ft. E, Sec. 164, Blk. 3, I.&G.N. Sur. ..... Rig.
Stanolind O. & G. Co.'s No. 2 Cobb, 330 ft. S and E, Sec. 165, Blk. 3, I.&G.N. Sur. ..... Drlg. 853 ft.
Sullivan & Ochiltree's No. 1-A Morse, 330 ft. S and W, N½ NE, Sec. 15, Blk. A-9, H.&G.N. Sur. ..... S.D. 2,686 ft.
The Texas Co.'s No. 1 Webb, 330 ft. S and E, Sec. 12, Blk. 36, H.&G.N. Sur. ..... Spud.
Warner Oil Co.'s No. 1 Morse, 330 ft. S and W, N½ NW, Sec. 68, Blk. 25, H.&G.N. Sur. ..... Cellar.

HUTCHINSON COUNTY

Canadian River Gas Co.'s No. 1 Dunnaway, 330 ft. N, 1,320 ft. E, NE NE, Sec. 5, Blk. Y-2, T.T. Sur. ..... Drlg. 2,100 ft.
Continental Oil Co.'s No. 1 Moore, 990 ft. S, 2,276 ft. W, S½ SW, Sec. 21, Blk. M-21, T.C. Sur. ..... Drlg. 815 ft.
Deal O. & G. Co.'s No. 2 Sanford, 330 ft. N and E of N 80 ac., S 160 ac., Sec. 81, Blk. 46, H.&T.C. Sur. ..... S.D. 450 ft. (SLM).
Dixon Creek Oil Co.'s No. 1-F Johnson Bros., 330 ft. N and E of W 67 ac., SW, Sec. 15, Blk. XO3, H.&O.B. Sur. ..... Drlg. 2,950 ft.
Huber Prod. Co.'s No. 1 Johnson Bros. (Premier), 330 ft. N and E of W 60 ac., N 80 ac., NW, Sec. 3, Blk. Y, A.&B. Sur. ..... Drlg. 475 ft.
Huber Pet. Co.'s No. 1 McIlroy, 330 ft. S, 330 ft. W, Sec. 28, Blk. Y, A.F.B. Sur. ..... Drlg. 400 ft.
Liner Drlg. Co.'s No. 1-D Johnson Bros., 330 ft. N and E, W½ SW, Sec. 6, Blk. 1, B.&B. Sur. ..... S.D. 2,990 ft; 20,000,000 ft. gas 2,974 ft.
Liner et al's No. 1 Johnson Bros., 990 ft. S, 330 ft. E, W½ SE, Sec. 29, Blk. Y, A.&B. Sur. ..... Spudded and S.D.
Phillips Pet. Co.'s No. 1 Hamilton, 990 ft. E, 1,650 ft. S, Sec. 22, Blk. 47, H.&T.C. Sur. ..... Location.
Stanolind O. & G. Co.'s No. 1 Barnhill, common cor. of Tracts 28, 29, 30 and 31 of G. Martinez Sur. Blk. 2 ..... Fishing 3,109 ft.
Stanolind O. & G. Co.'s No. 2-A Pitcher, 990 ft. S, 330 ft. W, SE, Sec. 19, Blk. M-21, T.C.R.R. Sur. ..... Drlg. 2,630 ft.
Skelly Oil Co.'s No. 1 Johnson Bros., 660 ft. S and W, SE, Sec. 30, Blk. Y, A.&B. Sur. ..... S.D. 3,115 ft.
The Texas Co.'s No. 1 Moore, 990 ft. N, 330 ft. W, SE, Sec. 21, Blk. M-21, T.-C. Ry. Sur. ..... Spud 195 ft.
Texlivania Oil Co.'s No. 1 Harvey, 330 ft. N and W, SW NW, Sec. 14, Blk. M-21 ..... Fishing 2,340 ft.

LIPSCOMB COUNTY

Okla. Public Service Co.'s No. 1 C. W. Jones, NE SW, Sec. 100, H.&T.C. Sur. ..... T.D. 5,003 ft.

LUBBOCK COUNTY

Center Oil Co.'s No. 1 Bowles Ranch ..... Small S.O. 1,133-40 ft; S.D. 4,167 ft.

MOORE COUNTY

Cloud & Dana's No. 1 Jones, 330 ft. N and E, SW, Sec. 169, Blk. 3-T, T.&N.O. Sur. ..... Drlg. 3,040 ft.
Continental Oil Co.'s No. 1 Brown, 990 ft. N and W, SE, Sec. 172, Blk. 3-T, T.&N.O. Sur. ..... Drlg. 2,900 ft.
Dana O. & G. Co.'s No. 1 R. Utey, 330 ft. S and W, NE, Sec. 135, Blk. 3, T.&N.O. Sur. ..... Rig up; standard tools 2,571 ft.
Gulf Prod. Co.'s No. 2 Kilgore, C SE, Sec. 29, Blk. P.Mc., E.L.R.R. Sur. ..... Drlg. 2,450 ft.
Sunray Oil Co.'s No. 1 Rupert, 660 ft. N, 330 ft. E, NW, Sec. 191, Blk. 3-T, T.&N.O. Sur. ..... Cellar.
Plains Holding Co.'s No. 1 Bridges, 1,690 ft. S and E, NW, Sec. 252, Blk. 3-T, T.&N.O. Sur. ..... Set 8¼-in. csg. 2,695 ft.
Sunray Oil Co.'s No. 2 Jones, 330 ft. S, 990 ft. E, W½ SW, Sec. 144, Blk. 3-T, T.&N.O. Sur. ..... Rig on ground.

MOTLEY COUNTY

Matador Oil Corp.'s No. 1 Owens, C NE, Sec. 10, Blk. G, B.&B. Sur. ..... S.D. 580 ft.

OLDHAM COUNTY

Amalgamated German-American Oil Corp.'s No. 1 Norton, 330 ft. S and E, Sec. 12, T.&N.O. Sur. ..... Spudded and S.D.
Chambers et al's No. 1 Herring, CNI, Sec. 29, Blk. S, G.C.&S.F. Sur. ..... S.D. 680 ft.

POTTER COUNTY

Canadian River Gas Co.'s No. 1-B Crawford ..... Fishing 2,250 ft.

WHEELER COUNTY

Devore & Robinson's No. 1 Sitter, 2,310 ft. S and E, Sec. 33, Blk. 24, H.&G.N. Sur. ..... Drlg. 2,193 ft.
Reno Oil Co. et al's No. 1 D'spain, 330 ft. N and W, NE, Sec. 52, Blk. 24, H.&G.N. Sur. ..... Drlg. 2,200 ft.
Vollmert's No. 1 Porter, 330 ft. S and E, NE, Sec. 15, Blk. 27, H.&G.N. Sur. ..... Rigged up and S.D.

WILDCAT OPERATIONS IN WEST TEXAS

(Continued from Page 68)

Grisham & Hunter's No. 2 Garren, 2,475 ft. from S and 1,566 ft. from E, Sec. 20, Blk. 89, Public School Land .. Shut down 1,520 ft.
Kornrumpf et al's No. 1 Garren, 330 ft. S and W, Sec. 15, Blk. 79, Public School Land ..... Shut down 1,240 ft.

DAWSON COUNTY

Albaugh et al's No. 1 Robinson, C NW, Sec. 46, Blk. M, E.L.&R.R. Sur. ..... Spudded 20 ft. and shut down.

ECTOR COUNTY

Galt, Brown & Penn's No. 1 Cowden, C SE, Sec. 12, Blk. 44, Twp. 2s, T.&P. Sur. ..... Shut down 180 ft.
H. F. Wurtz' No. 1 E. A. Ibbetson et al, 330 ft. from N and E lines of NW, Sec. 16, Blk. 46, Twp. 3s, G. M. M.Br.&A. Sur. ..... Shut down 3,275 ft.
Southern Crude Oil Pur. Co.'s No. 2 Crowder & Co., 660 ft. from S and W of NE cor., Sec. 34, Blk. 43, Twp. 1n, T.&P. Sur. ..... Drlg. 3,840 ft.

EL PASO COUNTY

Lane-The Texas Company's No. 1 Malone, 2,110 ft. from SW and NW of Sec. 46, J. M. Day Sur. ..... Shut down 3,089 ft.
Tri-State Oil Co.'s No. 1 Bobadella, 1,325 ft. from S and E lines, Sur. No. 254, S.F. No. 7,247 ..... Shut down 540 ft.

FISHER COUNTY

Roeser & Pendleton's No. 1 Gribble (Russell), 660 ft. from S and 440 ft. from W of NW, Sec. 210, B.B.B. &C. Sur. ..... Drlg. 2,475 ft.

GAINES COUNTY

Texas Consolidated Oil Co. et al's No. 1 Jones, 2,310 ft. from NE, Sec. 4, Blk. A-8, P.S.L. Sur. ..... Drlg. 1,975 ft.

GARZA COUNTY

Pandem Oil Corp.'s No. 1 Justice, 330 ft. from S and W of Sec. 12, Blk. 4, H.&G.N. Sur. ..... Spudded and shut down.
Perry & Posey's No. 1 Justice, 1,980 ft. from S and 1,680 ft. from E of Sec. 25, Blk. 6, H.&G.N. Sur. (3,500-ft. cable tool test) ..... Drlg. 85 ft.

GLASSCOCK COUNTY

World Oil Co.'s No. 3-C McDowell, 2,310 ft. from S and W of NE cor., Sec. 21, Blk. 34, Twp. 2s, T.&P. Sur.. Temp. aband.; total depth 660 ft.

HOWARD COUNTY

Continental Oil Co.'s No. 1 Brindley, 660 ft. from S and E of Sec. 18, Blk. 33, Twp. 1s, T.&P. Sur. ..... Drlg. 240 ft.
Green O. & R. Co.'s No. 1 Denman, 990 ft. from S and 2,310 ft. from W, Sec. 14, Blk. 30, Twp. 1s, T.&P. Sur... Spudded and shut down.
Group No. 1 Oil Corp.'s No. 2 Eason, 1,320 ft. from S and W, Sec. 6, Blk. 32, Twp. 2s, T.&P. Sur. ..... Shut down 2,444 ft.
Moody Oil Corp.'s No. 33-B Roberts, 990 ft. from N and W of Sec. 137, Blk. 29 ..... Temp. aband. 261 ft.

HUDSPETH COUNTY

Patillo & Welch's No. 1 Briggs, 300 ft. from S and W, Sec. 13, Blk. 72, Twp. 7, T.&P. Sur. ..... Drlg. 155 ft.
Theison's No. 1 University, 3,050 ft. from S and 2,225 ft. from E of Sec. 17, Blk. E ..... Spudded 35 ft. and shut down.

IRION COUNTY

Central Oil Co.'s No. 2 Horney, 150 ft. from N and 1,320 ft. from E, Sec. 3, Blk. 3, H.&T.C. Sur. ..... Shut down 1,360 ft.
Denny & Andrews' No. 1 Tankersley, 1,000 ft. from E and 460 ft. from S of H. J. Volker Sur. No. 723 ..... Shut down 1,374 ft.
Dixie Oil Co.'s No. 1 Williams, 1,320 ft. from S and E of Sec. 1,196, T.T.R.R. Sur. ..... Underreaming 1,780 ft.
Straughn & Texannati Oil Co.'s No. 1 Tankersley, 150 ft. from S and 750 ft. from W of Sec. 4, Gonzales County School Land ..... Plugging back to 1,220 ft. to shoot; total depth 1,506 ft.
F. F. Webb's No. 1 W. H. Williams, 200 ft. from E and 750 ft. from S line, SW NE, Sec. 10, Gonzales County School Land ..... Drlg. 590 ft.

JONES COUNTY

Bond & Trout's No. 1 Williams, 330 ft. S and E of SW cor. of J. W. Martin Sur. A-1,308 in Sec. 12 ..... Put on pump to test; est. 20-bbl. well; total depth 2,581 ft.
J. L. Hart et al's No. 1 Roberts ..... Total depth 1,000 ft.
Jameson et al's No. 1 King, 4,681 ft. from S and 150 ft. from E of M. Bueno Sur. No. 196 ..... Total depth 1,550 ft.; will junk hole and skid.
Hardly Able Oil Co.'s No. 1 Butter, 5,790 ft. from S and 330 ft. from E of W. Littlefield Sur. No. 382, Abst. 251 ..... Running 12½-in. casing 540 ft.
Shaheen et al's No. 1 Chittim, 165 ft. from S and W of 139.8-acre farm in G. Martinez Sur. No. 195 ..... Drlg. 1,740 ft.
Yingling et al's No. 1 Williams, 330 ft. N and E of SE cor. of Cade 160-acre tract but in Williams 200-acre farm, Sec. 17, Blk. 19, T.&P. Sur. ..... Drlg. 2,310 ft.

LOVING COUNTY

Eppenauer et al's No. 2 Allen, 2,310 ft. from NE and 330 ft. from NW, Sec. 90, Blk. 1, W.&N.W. Sur. ..... Drlg. 3,165 ft.
Falbre & Evans' No. 1 Dean, 330 ft. from NE and 990 ft. from NW, Sec. 79, Blk. 33, H.&T.C. Sur. ..... Cem. 10-in. casing 767 ft.; total depth 1,015 ft.
Henshaw et al's No. 2 Reagan & McElvain, 1,650 ft. from SW and 990 ft. from SE, Sec. 34, Blk. 7, W.&N.W. Sur. ..... Rig.
Hoffman et al's No. 1 Ramsey et al, 330 ft. NE and SE Sec. 33, Blk. 1, W.&N.W. Sur. ..... Shut down 550 ft.
Hoffman et al's No. 2 Ramsey et al, 2,310 ft. from NE and 330 ft. from SE, Sec. 33 ..... Bldg. rig.
Irwin and others' No. 1 Auld, 1,825 ft. from NE and 1,298 ft. from NW, Sec. 67, Blk. 1, W.&N.W. Sur. ... Rig.
Lockhart & Co.'s No. 3 Bowon & Wells, 330 ft. from NE and SE of Sec. 92, Blk. 1, W.&N.W. Sur. ..... Shut down 4,050 ft.
Lockhart & Co.'s No. 3 fee, 676 ft. S, 330 ft. W, Sec. 91, Blk. 1, W.&N.W. Sur. ..... Rigged up and shut down.
Lockhart's No. 1 Hubbard, 6,930 ft. from NE and 330 ft. from SE, Sec. 82, Blk. 33, H.&T.C. Sur ..... Cem. 6⅝-in. casing 4,027 ft.
Lockhart & Co.'s No. 3 Hubbard, 1,650 ft. from NE line, 330 ft. NW line of Sec. 33, H.&T.C. Sur. ..... Rigged up and shut down.
Rush et al's No. 1 Wheat, 330 ft. from NW and SW, Sec. 77, Blk. 1, W.&N.W. Sur. ..... Cellar.
Slagel Drig. Co.'s No. 1 Cartwright et al, 2,310 ft. from S and 990 ft. from W, Sec. 1, Blk. 57, Twp. 1, T.&P. Sur. ..... Shut down 2,914 ft.
Tennant et al's No. 1 Martin, 990 ft. from NW and SW Sec. 66, Blk. 1, W.&N.W. Sur. ..... Rig.
California Co.'s No. 2 Allen, 2,310 ft. from SE and SW lines, Sec. 90, Blk. 1, W.&N.W. Sur. ..... Drlg. 2,890 ft.
California Co.'s No. 3 Allen, 2,191 ft. from NW and 2,183 ft. from SW, Sec. 90, Blk. 1, W.&N.W. Sur. ... Rig.
California Co.'s No. 4 Allen, 3,131 ft. from NW and 3,113 ft. from SW, Sec. 90, Blk. 1 ..... Bldg. rig.
California Co.'s No. 7 Reagan & McElvain, 2,031 ft. from SE and 1,014 ft. from NE of Sec. 84, Blk. 1, W.& N.W. Sur. ..... Total depth 4,349 ft.; plugged back to 4,358 ft.; top pay 4,305 ft.; shot 200 quarts 4,303-46 ft.; flowed 250 bbls. first 24 hrs.; cleaning out.
West Texas Pet. Corp.'s No. 1 Salsbury, 330 ft. from NW and SW, Sec. 89, Blk. 1, W.&N.W. Sur. ..... Drlg. 2,000 ft.

MENARD COUNTY

Priest's No. 1 Sorrell, 1,000 ft. from E and 200 ft. from S cor., Sec. 132, E.L.R.R. Sur. ..... Shut down 2,655 ft.
Voss & Bryan and others' No. 1 F. Bredenberger, 600 ft. from N and 1,000 ft. from W Sec. 455, E. Henkel Sur. ..... Drlg. 250 ft.

MITCHELL COUNTY

Lewis & Slagel's No. 1 Bell ..... Cleaning out 2,820 ft.; swabbing 60 bbls. oil daily; total depth 2,827 ft.

PECOS COUNTY

Cardinal Oil Co.'s No. 1 White & Baker, 990 ft. from N and 990 ft. from E, Sec. 47, Blk. 194, T.C.&S.F. Sur. ..... Drlg. 102 ft.
Culberson Bros.' No. 1 Toppett (Humble), 150 ft. S and 843 ft. E of C Sec. 40, Blk. 194, G.C.&S.F. Sur. ..... Drlg. 126 ft.
Dittman's No. 1 Jackson, 2,310 ft. from NE and 330 ft. from NW, Sec. 28, Blk. 3, H.&T.C. Sur. ..... Drlg. 1,420 ft.
Disney & Gholson's No. 1 C. O. Wilson, 330 ft. from S and 330 ft. from W, Sec. 27, Blk. 142, T.&St.L. Sur... Location.
Lancaster's No. 1 Eaton (Pure), 330 ft. from SE and SW, Sec. 35, Blk. 3, H.&T.C. Sur. ..... Cem. 6⅝-in. casing 965 ft.; total depth 970 ft.
Magnolia Pet. Co.'s No. 1 Eaton, 2,310 ft. from SW and 330 ft. from NW, Sec. 35, Blk. 3, H.&T.C. Sur. ..... Shut down 1,425 ft.
McCurdy & Brown's No. 2 Tippett, 150 ft. from N and W of SE, Sec. 40, Blk. 104, G.C.&S.F. Sur. ..... Location.
McCarty Oil Co.'s No. 3 Gray, 700 ft. from N and 2,260 ft. from W, Sec. 591, G.C.&S.F. Sur. ..... Fishing 1,437 ft.
Messenger et al's No. 1 Butz, 1,830 ft. from NW and 1,170 ft. from SW, Sec. 54, Blk. 10, H.&G.N. Sur. .... Shut down 1,299 ft.
J. R. Miller et al's No. 1 Bennett, 359 ft. W of CWL, Sec. 1, Blk. 119, G.C.&S.F. Sur. ..... Shut down 2,283 ft.
Penn Oil Co. et al's No. 1 Alvis, 2,358 ft. from S and 1,327 ft. from W, Sec. 155, Blk. 3, T.&P. Sur. ..... Drlg. 2,296 ft.
Perren Oil Co.'s No. 2 Eaton, C of E, Sec. 27, Blk. 3, H.&T.C. Sur. ..... Drlg. by tools 1,765 ft.
Pure Oil Co.'s No. 1 Harrison, 2,310 ft. from N and 330 ft. from W of Sec. 203, Blk. 3, T.&P. Sur. ..... Shut down 5,000 ft.
Riser & White's No. 1 Riser, 2,297 ft. from S and 997 ft. from E of Sec. 24, Blk. 12, H.&G.N. Sur. ..... Shut down 500 ft.
California Co. et al's No. 1 Thomas, 990 ft. from NW and SW, Sec. 31, Blk. 34, H.&T.C. Sur. ..... Location.
The Texas Company's No. 1 Wright, 660 ft. S and E of NW cor., Sec. 9, Blk. 131, T.&St.L. Sur. ..... Shut down 3,504 ft.

REAGAN COUNTY

Big Lake Oil Co.'s No. 6-C University, 1,120 ft. S and 1,100 ft. from W, Sec. 25, Blk. 9 ..... Location.

REEVES COUNTY

R. T. Hansford's No. 1 Williams, 150 ft. from S and W, Sec. 17, Blk. 6, H.&G.N. Sur. ..... Shut down 380 ft.
Salsbury & Gregory's No. 1 Young Bell, 1,170 ft. from N and 330 ft. from NW line, Sec. 34, Blk. 7, H.&L.N.... Temporarily abandoned.
Lee O. White et al's No. 1 Hershersor, 330 ft. from N and W lines of Sec. 5, Blk. 51, Twp. 10, T.&P. Sur.... Shut down 4,415 ft.
California Co.'s No. 2 Kloh & Rumsey, 990 ft. from S and 1,520 ft. from E, Sec. 11, Blk. 54, Twp. 4, T.&P. Sur. ..... Drlg. 1,250 ft.

RUNNELS COUNTY

Dutton et al's No. 1 Dean, 5,475 ft. from NE and 1,048 ft. from NW in J. Heil Sur. No. 419 ..... Shut down 2,175 ft.

SCHLEICHER COUNTY

Eastland Oil Co.'s No. 1 Joe Tisdale, C Sec. 29, Blk. M, G.H.&S.A. Sur. ..... Drlg. 1,525 ft.
Teas & Gant's No. 1 Allison, 1,320 ft. N and E of SW cor., Sec. 37, Blk. K, G.H.&S.A. Sur. ..... Shut down 5,006 ft., contract depth.
Wesner et al's No. 1 Nicks, 2,310 ft. from N and 2,362 ft. from E of Sec. 77, Blk. LL, T.C. Sur. ..... Lowering 12½-in. casing; total depth 1,060 ft.
George Wilson's No. 1 Page, Sec. 40, Blk. L, 1,290 ft. from N, 1,470 ft. from W, G.H.&S.A. Sur. ..... Shut down 5,027 ft.

SCURRY COUNTY

G. E. Dickman and R. B. Pender et al's No. 1 F. C. Davis, 1,000 ft. N and 1,770 ft. W of SE cor. of Sec. 275, Blk. 2, H.&T.C. Sur. ..... Cleaning out 5,000 ft.
Scurry County Oil Exchange's No. 1 Earnest, 2,310 ft. from N and W, Sec. 68, Blk. 3, H.&G.N. Sur. ..... Spudded and shut down.
Seifert & Dibble's No. 1 T. M. Blackburn, 2,310 ft. from N and 2,310 ft. from W line of Sec. 155, Blk. 97, H.&T.C. Sur. ..... Running 6⅝-in. casing 2,376 ft.

STERLING COUNTY

Beesley et al's No. 1 Foster, 2,940 ft. N and 300 ft. W of SW cor., Sec. 7, Blk. 32, E.&T.C. Sur., but in Sec. 16, Blk. 31, Twp. 4s, T.&P. Sur. ..... Shut down 637 ft.

TAYLOR COUNTY

John B. Jameson's No. 1 Webb, 1,170 ft. S and W of NE cor., Sec. 46, Lunatic Asylum Land ..... Drlg. 6,294 ft.
Sanger et al's No. 1 City of Abilene, 330 ft. from S and 1,400 ft. from E of Sec. 66, Blind Asylum Land ..... Shut down 2,785 ft.

TERRELL COUNTY

Big Bend Oil Co.'s No. 1 Bassett, C NW, Sec. 155, Blk. D, M.-K.-T.- Sur. ..... Shut down 2,669 ft.
Keck Pecos Trust Co.'s No. 1 Hamilton, C, Sec. 6, Georgetown Ry. Sur. ..... Shut down 3,150 ft.
Miller Bros.' No. 1 Allison & Burke, C NW cor., Sec. 10, Blk. 176, T.&P. Sur. ..... Shut down 120 ft.
Mrs. J. B. McPhees' No. 1 Sam Belt, C, Sec. 16, Blk. D-7, E.L. Sur. ..... Shut down 880 ft.; moved off machine.
Transcontinental Oil Co.'s No. 1 Goode, 2,152 ft. from E and 330 ft. from S, Sec. 26, Blk. 161, G.C.&S.F. Sur... Drlg. 5,642 ft.; no increase in gas.
Jones' No. 1 Parkenham, C SE NW, Sec. 43, Blk. B-2, C.C.S.D.&R.G.N.G. Sur. ..... Drlg. 700 ft.

TOM GREEN COUNTY

Belding & Dutton's No. 1 Norsworthy, 2,640 ft. from S and 587 ft. from E of John McNeese Sur. ..... Shut down 760 ft.; show oil and gas 725 ft.

GRANT

BALL TYPE AND SCREW TYPE CEMENT HEADS

LIGHTNING CHANGE Cement Heads

If you want to complete your cementing jobs "lightning fast" and with least danger if an emergency arises, use GRANT Cement Heads—noted throughout the oil world for their speed and dependability.

A tight joint is obtainable in *30 seconds* because of a special locking device and a positive, leak-proof connection can be had without loss of time to connect or disconnect the hose. No slips! Never sticks! High pressures increase the perfection of the positive seal attained with GRANT Heads. Also invaluable for use as circulation heads while washing in casing as they can be installed while pipe is in motion—practically eliminating stuck pipe.

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A TIGHT JOINT IN 30 SECONDS

The GRANT Ball Locking Device

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A feature of the Grant Ball Type Cement Head. Locks head on casing collar quick as a flash. Head easily drops onto casing collar but will not blow off, even under high pressure, due to wedging of steel balls against collar and tapered seats. Operation of the side handle lifts the balls and instantly frees the head for removal.

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LINER PULLERS
CEMENT HEADS
ENDURANCE BITS
STRAIGHT HOLE GUIDES
SAFETY AUTOMATIC PUMP PRESSURE RELEASE

"USED WHERE PERFORMANCE COUNTS"

Fitzgerald & Taliaferro's No. 1 Bennett, C SW, Sec. 1,628, E. H. Dinger Sur. ..... Plugged back to 2,405 ft. to straighten hole; shut down 2,447 ft.
Mintex Oil Co.'s No. 1 Campbell Est., 446 ft. from S and 630 ft. from W of Sec. 180, Dist. No. 11, S.P. Sur. .... Shut down 1,994 ft.
Pratt & Hancock's No. 2 Lewis, 100 ft. N and 330 ft. E of most northerly SW cor. of Joshua S. Grant Sur. No. 2 ..... Shut down 200 ft.

UPTON COUNTY

Duffey and others' No. 1 McClintic, 990 ft. from N and 330 ft. from E, T.C.S.D.&R.G.N.G. Sur. ..... Rig.
Farley et al's No. 1 Lane, 330 ft. from S and W of NW, Sec. 36, Blk. 1, M.-K.-T. Sur. ..... Shut down 2,391 ft. for storage; est. 200-bbl. well.
T. P. Coal & Oil Co.'s No. 1 King Ranch Oil & Lignite Co., 2,310 ft. from N and 990 ft. from W, Sec. 28, Blk. 2, M.-K.-T. Sur. ..... Preparing to shoot 2,815 ft.

VAL VERDE COUNTY

Independent Operators' No. 1 Whitehead, SE SE, Sec. 10, Blk. 4, I.&G.N. Sur., elev. 1,175 ft. ..... Shut down 5,360 ft.
O. O. Owens' No. 1 Mills, Sec. 128, Blk. 1, I.&G.N. Sur., elev. 2,130 ft. ..... Waiting for cement to set 6,776 ft.

WARD COUNTY

Bradford et al's No. 1 Carson, 990 ft. from NE and SE Sec. 26, Blk. 5, H.&T.C. Sur. ..... Fishing 350 ft.
Beckley and others' No. 1 Johnson, 4,140 ft. from NE and 990 ft. from SE, Sec. 8, Blk. 32, H.&T.C. Sur.. Rig up spudder.
Buster Black's No. 1 Hall & Roberts, 990 ft. from NE and 1,650 ft. from NW Sec. 17, Blk. 34, H.&T.C. Sur. Location.
Clyde Bradford's No. 1 Hardinage and Welsor, 330 ft. from SE and 330 ft. from SW, H.&T.C. Sur. ..... Location.
Chester & Smith's No. 1 Booger, 1,200 ft. from SE and 150 ft. from SW Sec. 11, Blk. 5, H.&T.C. Sur. ..... Shut down 275 ft.
Gibson & Johnson's No. 1 Johnson, 4,140 ft. from SE and 990 ft. from NE Sec. 10, Blk. 32, H.&T.C. Sur.... Rigging up spudder.
Gulf Prod. Co.'s No. 3 Wristen Bros., 220 ft. NE of SW and 220 ft. SE of NW, Sec. 18, Blk. 5, H.&T.C. Sur... Show gas 1,960-70 ft.; filling up with sulphur water 2,520-77 ft salt water 2,515 ft.; plugged back to 2,477 ft.
Gulf Prod. Co.'s No. 16 O'Brien, 2,310 ft. from S and 990 ft. E, Sec. 16, Blk. F, L.M.&W.B.&A. Sur. ..... Cleaning out 2,545 ft.
Magnolia Pet. Co.'s No. 1 Sealy (Atlantic), 2,130 ft. from S and 1,650 ft. from E. Sec. 45, Blk. F, G.M.M.B.&A. Sur. ..... Underreaming 1,620 ft.
R. F. Owens' No. 1 Johnson, 100 ft. from NE and 1,100 ft. from SE of Sec. 8, Blk. 33, H.&T.C. Sur. ..... Shut down 2,800 ft.
Peck and others' No. 1 Merrett, 2,166 ft. from NE and 2,648 ft. from SE Sec. 11, Blk. 5, H.&T.C. Sur. ..... Spud.
Prairie O. & G. Co.'s No. 1 Hill, 330 ft. from NE and NW, Sec. 30, Blk. B-29, P.S.L. Sur. ..... Swabbed 70 bbls. 24 hrs.; total depth 2,405 ft.
Paul Ryan's No. 1 Allen, 998 ft. from NW and 3,624 ft. from NE, Sec. 11, Blk. 5, H.&T.C. Sur. ..... Cleaning out; top pay 2,180 ft.
Reckford & Ferglarr's No. 1 Booger, 4,051 ft. from NE and 1,983 ft. from SE, Sec. 11, Blk. 5, H.&T.C. Sur... Drlg. 100 ft.
Shipley et al's No. 5 Hayzlett, 2,490 ft. from SE and 1,980 ft. from SW, Sec. 17, Blk. 5, H.&T.C. Sur. ..... Top pay 2,465 ft.; shot 150 qts. 2,456-2,500 ft.; drlg. 2,570 ft.
California Co. et al's No. 1 Lanham, 990 ft. from NE and SE, Sec. 25, Blk. 34, H.&T.C. Sur. ..... Building rig.
California Co.'s No. 1 Gordon, 330 ft. from NE and SE, Sec. 6, Blk. 34, H.&T.C. Sur. ..... Drlg. 1,150 ft.
Shipley et al's No. 1 Monroe, 330 ft. SE SW, Sec. 3, Blk. 1 ..... Shut down 3,785 ft.

WINKLER COUNTY

Magnolia Pet. Co.'s No. 1 Walton, 2,310 ft. from N and W, Sec. 16, Blk. 77, P.S.L. Sur. ..... Drlg. 2,793 ft.
Liner Drlg. Co.'s No. 1 Campbell, 330 ft. from N and E cor., Sec. 2, Blk. B-5 ..... Shut down 4,610 ft.

WILDCAT OPERATIONS IN MISSISSIPPI

CLARK COUNTY

Company, farm and location— Remarks—
Gulf Ref. Co.'s No. 1 Box, 526 ft. W. 498 ft. N. C SE, Sec. 11-2n-15e ..... Rig up.

CLAY COUNTY
(Cable tools)

Ohio Oil Co.'s No. 1 Cantrell, NE cor., Sec. 16-15-5..... Fishing for bit; sandy shale 2,920 ft.

COVINGTON COUNTY

United Prod. Co.'s No. 1 McIntosh (was S. P. Borden et al's), 330 ft. S. 330 ft. W. NE cor. SW NE, Sec. 8-8-16 ..... Fishing D.S; T.D. 3,378 ft.

GRENADA COUNTY

Carter-Pace's No. 1 Dubard (was F. E. West et al's), NW NW, Sec. 18-22-4 ..... Cored gray sand 3,208 ft; rathol ing ahead.

HINDS COUNTY

Attkisson & Dyer's No. 1 Downing et al, SE NE, Sec. 27-6-1 ..... Cmtd. 15½-in. csg. 85 ft; drlg. 500 ft.
Cane River O. & G. Co.'s No. 1 Kabbles, NE cor. SW SW, Sec. 15-5-1e ..... Temp. abd. 3,270 ft.
Gulf Ref. Co.'s No. 1 McLaurin, 1,230 ft. S. 1,410 ft. W. NE cor., Sec. 30-6-2e ..... Losing returns; drlg. out cmt. 2,485 ft; T.D. 2,646 ft.
Howard Oil Co.'s No. 1 Jackson College, C NW NW, Sec. 9-5-1e ..... Drlg. 215 ft.
Southern Pet. Co.'s No. 1 Wilson (was Tri-State O. & G. Co.'s), 320 ft. E. 240 ft. N. SW cor. SE NE, Sec. 28-6-1e ..... S.D. 20 ft.

JASPER COUNTY

Bay Springs Pet. Co.'s No. 1 Keys, C NW NE, Sec. 21-2-10 ..... Resumed operations Feb. 26; drlg. 104 ft.

LAFAYETTE COUNTY

Banks-Good et al's No. 1 May, 113½ rds. S. 26 rds. E. NW cor. SW, Sec. 32-10-1w ..... Derrick.

MADISON COUNTY

Central O. & G. Co.'s No. 1 Cameron, 200 ft. W. 200 ft. N, SE cor., Sec. 11-9-1e ..... Cored hard black slate 3,165 ft.

MONROE COUNTY

Amory Dev. Co.'s No. 1 Bourland, Sec. 2-13-19 ..... W.O. 3,007 ft.
Amory Pet. Co.'s No. 1 Harris, SW cor. SE SE, Sec. 13-13-7 ..... Drlg. sand.
Park Bowser et al's No. 1 Cowart, second hole, Sec. 2-12-9 ..... Drlg. shale 1,620 ft.

RANKIN COUNTY

R. A. Moore et al's No. 1 Interior Lbr. Co., Sec. 28-6-1e.. S.D. 900 ft.
Cleve Love's No. 1 Muse, SE cor. SW SW, Sec. 32-7-4e Drlg. shale 2,208 ft.
Millstein O. & G. Co.'s No. 1 Gammill-Hartsfield, 400 ft. E, 400 ft. N. SW cor. SW SE, Sec. 6-5-2e.. ..... W.O. 2,503 ft.

SMITH COUNTY

Pocahontas Nat. Gas Co.'s No. 1 Adams-Banks Lbr. Co., C NE SW NW ..... Setting 10-in. csg. 450 ft.

WARREN COUNTY

Dixie Pet. Co.'s No. 1 Clark, 300 ft. E. 660 ft. S. NW cor., Sec. 31-17-5 ..... Arranging to test 2,248 ft.

WINSTON COUNTY

Miss. Drlg. Co.'s No. 1 Scarbrough, NW cor., Sec. 15-12-14. Making D.S. test 2,379 ft.

YALOBUSHA COUNTY

Collett-Carter Oil Co.'s No. 2 Blackmur, 990 ft. W. 285 ft. N. C. Sec. 14-11-4 ..... Drlg. 2,430 ft.

USE OF REFRIGERATION IN GASOLINE PLANTS

(Continued from Page 103)

ice machine, operated at 150 pounds head pressure, which was direct connected to a 125 horsepower, tandem-compound, steam-driven Corliss engine.

Cooling by Refrigerated Brines

Another plant employing the conventional ammonia cycle was replaced as late as 1927 by the present absorption method, which incidently resulted in an increased plant yield of 75 per cent. This plant, in addition to its ordinary water cooling of the inlet gas, used ammonia to cool the gas further before introducing it into the expander unit. The gas from the water coolers was caused to flow through one continuous 4-inch pipe coil, 450 feet long, arranged in a well insulated wooden tank. Cold calcium chloride brine from the ammonia evaporator was pumped into the bottom of this wooden box, the brine flowing upward and around the coil so that heat was removed from the gas and stored in the brine solution. The brine overflow from the cooler was returned by gravity to the ammonia evaporator where the absorbed heat was removed making the brine suitable for recirculation. In this case the refrigeration capacity was such that the exit gas temperature was 34° F., a temperature selected with the idea of removing at this point in the system all of the water vapor contained in the gas, thus preventing freeze-ups in the expander heat interchanger.

In 1918 another type of refrigeration gasoline plant was placed in operation using brine, previously refrigerated by a conventional ammonia refrigeration unit, as a cooling agent for the gas. A number of plants were built based on this principle, which was simply to condense the gasoline from the gas by lowering its temperature by means of direct contact or washing with the cooling medium. Some trouble was encountered with this process because the moisture carried by the gas was also liquefied, which naturally diluted the cooling brine. With a decrease in brine density the system tended to freeze up. For this reason practically all such plants were built with duplicate washing towers so that in event of freezing, operation could be shifted to the standby tower while the original unit was thawed out. To help prevent dilution of the brine a routine developed which required the solution to be periodically evaporated to the desired density before use in the washers. Gasoline condensed out of the gas accumulated on top of the brine at the bottom of the washer. It was hence an easy matter to draw the product off separately to storage while recirculating the brine through the cooler and back into the top of the washer. The residue gas from such a plant was, of course, utilized in a heat exchanger for subcooling the wet incoming gas to the washer, but even so, the blow-off stack was always heavily frosted regardless of the time of year.

Refrigeration in Absorption Plant

In the same year, the first combination refrigeration-absorption plant was completed and operated upon the residue gas from a 250-pound compression plant. This plant, however, was constructed initially as a straight cooling proposition, but due to troubles early experienced with the washer freezing up, and discoloration of the product, the cooling medium was changed to naphtha. The gas was allowed to flow through cork-insulated towers filled with wooden-grids over which was showered naphtha previously cooled to 35° F. by the direct expansion of ammonia in the outer shell of a 2″x3″ double pipe exchanger. The gasoline resulting from this combined effect of absorption and chilling accumulated with the naphtha in the base of the absorber, and the excess not required for recirculation was run to storage. In this plant the extraction was said to have been 0.26 gallon per 1,000 cubic feet of gas processed, of which 20 per cent was credited to the subcooling of the naphtha.

The following year, 1919, two absorption plants installed refrigeration units. These systems were identical with the one just described, except mineral seal oil was used in place of naphtha, and the gasoline was removed from the oil in the conventional manner using steam distillation. The plant located in Oklahoma added a second factor in that the gas was likewise cooled. Because of the peculiar geographical location of this latter plant, water for cooling purposes was at a premium, especially in the summer. As a result of this refrigeration of the oil, it was claimed that the increased yield of gasoline was equivalent to 35 per cent in production over a yearly period.

Between 1919 and 1921 practically no more refrigeration systems were used in absorption plants, although numerous schemes were tried and used for chilling the gas itself by the use of refrigerated brines and gasolines. In this latter year, however, one large oil company carried on extensive semicommercial tests in which the oil was cooled by refrigeration. Here again the ammonia compression system was used. The results of these tests did not warrant a commercial installation of the method because of the cost of producing the necessary refrigeration.

Stabilization of Natural Gasoline

In 1921 appeared the first commercial gasoline rectifier unit, operated at relatively low pressure, which accordingly required a low temperature in the top of the column. The manner in which this refrigeration was obtained was somewhat of a departure from past methods. Here the vapors leaving the column were recompressed, cooled and condensed; the necessary amount of the resulting gasoline being expanded from the pressure of condensation to column pressure at the point of entrance into the column. The expansion of the liquid in the upper part of the column produced refrigeration, which, together with the heat added at the bottom by the kettle, gave the required temperature gradient necessary for the desired rectification. Ordinarily, the temperature of the vapors leaving the top of the column with this system were of the order of 10° F. which corresponds to a column pressure of probably 8 pounds. Such temperatures again brought out the necessity for caution in their use, especially with gasoline containing moisture, which invariably caused operating difficulties. As a matter of fact, it was principally because of these difficulties that the low pressure system of rectification has been abandoned.

Natural Gasoline as Refrigerant

It might be of interest to know that in 1924 the United States Bureau of Mines conducted experiments which confirmed the early assumptions that volatile natural gasoline could be used to advantage in many refrigerating plants. These tests were made by L. D. Wyant using a small compression machine, the principle involved being the same as that commonly used when refrigerating by use of ammonia, sulphur dioxide, carbon dioxide or other similar substances. Three different grades were tried, an 85 gravity absorption product, a 90 gravity high stage compressor gasoline, and a 93 gravity product obtained by compressing the uncondensed still vapors of the low pressure absorption plant. The least satisfactory of these was the first, the most satisfactory the 95 gravity product.

Use of Propane as Refrigerant

The next recorded use of a subcooling method was in 1926, when a system was placed in commercial operation through the efforts of S. C. Carney. Here again the refrigerant was a product made from stabilizer residue vapor, and hence consisted of a narrow cut from natural gas. When liquefied, it had an initial boiling point of minus 50° to minus 60° F. and a final boiling point of 20° to 40° F.

With this method the vapors were taken from the stabilizer, compressed to approximately 175 pounds, condensed in a water-cooled tubular condenser, and the liquefied product stored in an accumulator. This liquid was then expanded to 20 pounds through the shell of an oil cooler, and the resulting vapors recollected and recompressed in the compressor. Once sufficient refrigerant was obtained the system became a closed cycle except for make-up made necessary through mechanical losses.

The absorption oil cooled in this fashion was circulated at the rate of 70 to 100 g.p.m. and was cooled through a range

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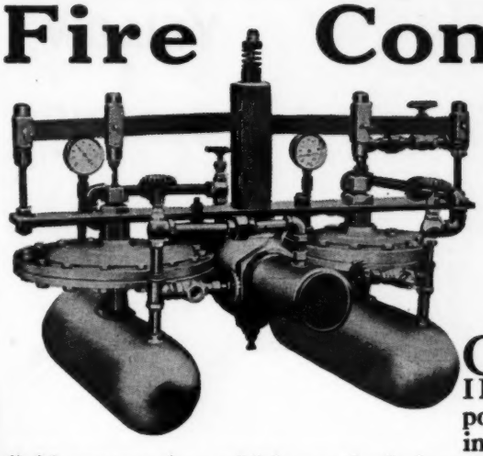

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of 25° to a final temperature of about 50° F. Very excellent control of the final oil temperature was obtained by manipulating the pressure at which the refrigerant was allowed to evaporate in in the cooler, and by regulating the amount of tube surface bathed in the evaporating liquid. No particular difficulties were encountered in the operation of this unit and we may conclude that it was entirely satisfactory from a commercial standpoint. At the time of its operation it was stated that a 160 horsepower engine would provide a temperature drop of 30° for an oil circulation of 150 gallons per minute. Cooling requirements for the condensation of the refrigerant consisted of an equal quantity of water with half the temperature rise.

Refrigerated Brines for Gas Cooling

So far as the writer knows there were few attempts to apply refrigeration methods within the industry between the years of 1927 and 1929. During this period, however, quite a serious effort was made on a semicommercial scale to develop a method of chilling the gas by means of refrigerated brine. This method was somewhat of an improvement over the earlier ones described in that the cooling of the brine itself was accomplished by direct contact with the cold gas leaving the plant. A very high degree of thermal efficiency was obtained in this manner.

The process consisted of contacting the incoming wet gas with a cold calcium chloride brine in a conventional bubble tower. Gas leaving this tower, at perhaps 17° F., was further cooled in an ammonia evaporator to minus 25° F., giving a point of major gasoline production. This extremely cold gas then entered a second tower over which was circulated the brine from the first tower, resulting in sufficient cooling of the brine for recirculating as an initial chilling agent for the wet gas. Aside from the ingenuity of the arrangement, the process had only a limited field, and in general, the efficiency of extraction was such as to make a commercial installation uneconomical except for treatment of small quantities of very rich gases. Somewhat better results were obtained experimentally by substituting gasoline for the brine, following the practice of some of the earlier plants.

Cooling by Propane Refrigeration

During the past year we have seen the adaptation of the method used by Carney to the cooling of Kettleman Hills gas preliminary to the usual absorption. The refrigerant in this case is obtained from the stabilizer overhead, with evaporation taking place in the gas cooler at a pressure of approximately 100 pounds and a temperature of 58° F. The vaporized refrigerant is compressed to 165 pounds, resulting in a liquefied refrigerant being available in the accumulator before evaporation at a pressure of 160 pounds and 84° F. The refrigerant is principally propane, the cycle approximating the conventional ammonia practice. The compression of approximately 5,000,000 cubic feet of this propane mixture results in the cooling of 60,000,000 cubic feet of wet gas per day through a temperature range of 35° F.

Cooling Oil by Propane Refrigeration

This same refrigerant is used in the absorber intercooler in lieu of the usual water cooling. That these methods of operation are effective are perhaps best testified to by the fact that the oil leaving the absorber is of the order of 95° F., where as you all know, the conventional practice is at least 130° F., or higher. The condition cited has permitted the use of a very low oil to gas ratio, somewhat under five, with a finished production equivalent to that obtained under former conditions with a ratio of approximately 8 to 1. Forgetting economy as far as the production of the refrigeration is concerned, these results demonstrate that on a fairly large commercial scale considerable savings can be made both from an operating standpoint and from the standpoint of initial cost.

Refrigeration Dictated by Economics

One large oil company is figuring on utilizing in a similar manner propane for cooling, or subcooling, the absorption oil to the absorbers in one of its plants in the tropics. In this particular region this will doubtless prove beneficial since the cooling water never is lower than 85° F. Another company, operating on a high pressure gas transmission line, is now figuring the relative advantages of cooling both the gas and oil by refrigeration to temperatures in the neighborhood of 40° F. Undoubtedly this year will see considerable advancement in the use of refrigeration means in the industry. In every case, this development should be governed by the results and benefits derived balanced against the cost of producing the refrigeration.

WILDCAT OPERATIONS IN KANSAS

(Continued from Page 44)

McPHERSON COUNTY

Henderson & Holden's No. 1 Sommerfield, NE NW Sec. 23-19-1w ..... Drlg. 2,954 ft.; showing 25 bbls. of oil and 50 bbls. of water a day; T. D. 3,227 ft.; shut down.
Slick et al's No. 1 Randall, C SW SW Sec. 35-17-3w ..... Water 3,612-46 ft.; abnd.

MORRIS COUNTY

Great Basin Oil Co.'s No. 1 Ballyntine, SW SE SE Sec. 18-16-5 ..... Fishing 2,290 ft.
Urschel et al's No. 1 Bersuch, NW SE NW Sec. 10-17-7 .. Machine.
Hankerson et al's No. 1 Cessman, SW SE Sec. 24-16-9 ... Shut down 900 ft.

NESS COUNTY

Gypsy Oil Co.'s No. 1 Coleman, C SW NE Sec. 25-17-25w .. Fishing 4,160 ft.

NORTON COUNTY

Richards et al's No. 1 Colby, Sec. 17-4-21w ..... Rig.

OSAGE COUNTY

Briggs & Smith's No. 1 Wood, SE NW Sec. 21-14-15 .... Drlg. 1,425 ft.

RAWLINS COUNTY

J. G. Durham et al's No. 1 Unknown, SW cor. Sec. 3-2-35w ..... Drlg. 2,433 ft.

RICE COUNTY

Detrick & Langston's No. 1 Purcell, NW cor. Sec. 33-19-9w ..... Rig.
McFadden and Shell's No. 1 Jennings, SW NE NW Sec. 29-18-6w ..... Drlg. 650 ft.
Cress et al's No. 1 Sharp, SE NE Sec. 13-20-10w ..... Drlg. 2,340 ft.
Allison-Fitzwilliams' No. 1 Blake, NE NW Sec. 9-18-10w .. Rig.
Muth Bros.' No. 1 Beyers, NE NW Sec. 21-19-9w ..... Silicious lime 3,213-44 ft.; swabbed 134 bbls. 8½ hrs.

ROOKS COUNTY

Empire Oil & Ref. Co.'s No. 1 Halsman, SW NE SE Sec. 17-7-20w ..... Cleaning out 1,335 ft.

RUSH COUNTY

Dewey & Mitchell's No. 1 Greenawalt, C SW Sec. 17-19-16w ..... Drlg. 785 ft.

RUSSELL COUNTY

Agate Oil & Gas Co.'s No. 1 Rochfellow, SE cor. Sec. 6-13-12w ..... Show oil 3,042-44 ft.; bailed 18 bbls. 3 hrs.; now shut down.
Gilbreath et al's No. 1 Bratton, C NE Sec. 33-11-13w .... Shut down 2,814 ft.

SEDGWICK COUNTY

Streeter & Stearns' No. 1 Tobin, SW SE NE Sec. 5-32-2 .. Drlg. 3,301 ft.
Buck et al's No. 1 McNananan, NE NW NW Sec. 2-29-1 .. Shut down 1,200 ft.

SALINE COUNTY

Sampson et al's No. 1 Sudenderf, NE SE Sec. 30-14-2w .. Shut down 3,265 ft.
Twin Mounds Oil Co.'s No. 1 Weis, C W half NE NW Sec. 20-13-4w ..... Shut down 2,700 ft.

SHERIDAN COUNTY

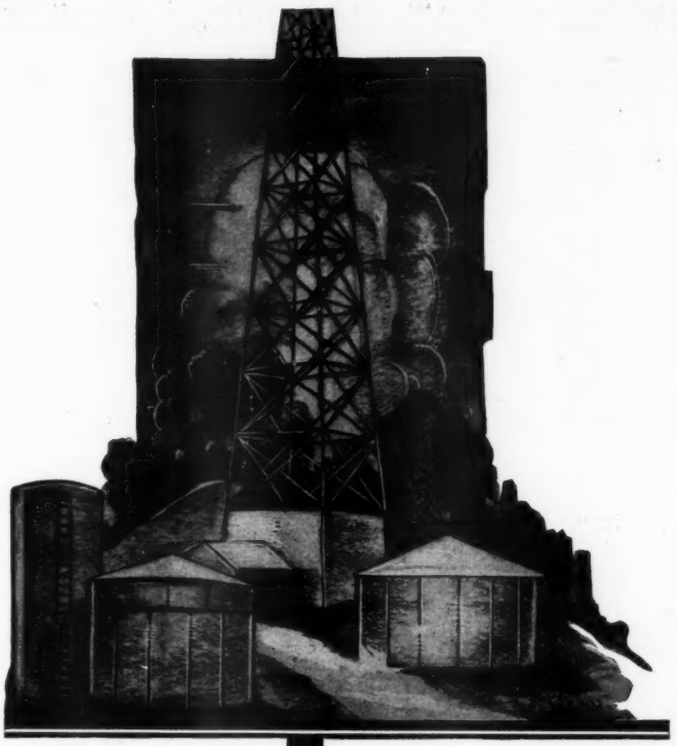
Flo et al's No. 1 Shoemaker, SE SW SW Sec. 27-7-26w ... Drlg. 390 ft.

STEVENS COUNTY

Sidwell et al's No. 1 Kelly, SW NE Sec. 16-34-38w ..... Drlg. 2,235 ft.

WASHINGTON COUNTY

Sincox et al's No. 1 Penwell, NW SE NE Sec. 16-3-3 .... Shut down 1,720 ft.



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CALIFORNIA'S PETROLEUM PRODUCTION FROM BEGINNING TO DECEMBER 31, 1930

California has produced more oil than any other American state. Oil production statistics in California were loosely kept until 1876, and only one field, Ventura-Newhall, is credited with production up to 1893. By that time Ventura-Newhall had produced 4,769,450 bbls. Up to the end of December, 1930, the State had produced 3,536,467,874 bbls. The largest producing field in the United State is Midway-Sunset in California, with a total of 693,004,999 bbls. Long Beach in less than nine years produced 419,777,898 bbls., and Santa Fe Springs in less than 10 years produced 305,814,707 bbls. Other large producing fields include Coalinga, 316,155,864 bbls. since 1896; Huntington Beach, 173,669,969 bbls. in less than 11 years, and Kern River, 282,519,129 bbls. since 1900.

Year	Kern River	Mount Poso	Fruitvale	Round Mountain	McKittrick	Sunset	Midway	Elk Hills	Lost Hills-Belridge	Coalinga	Kettleman Hills	Wheeler Ridge	Santa Maria
1896	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,119	.....	.....	.....
1897	.....	.....	.....	.....	.....	.....	.....	.....	.....	70,140	.....	.....	.....
1898	.....	.....	.....	.....	10,000	.....	.....	.....	.....	154,000	.....	.....	.....
1899	.....	.....	.....	.....	15,000	.....	.....	.....	.....	439,372	.....	.....	.....
1900	826,775	.....	.....	.....	80,000	12,500	.....	.....	.....	547,960	.....	.....	.....
1901	3,278,840	.....	.....	.....	430,450	188,500	3,235	.....	.....	535,432	.....	.....	.....
1902	8,988,046	.....	.....	.....	619,296	167,558	3,048	.....	.....	571,233	.....	.....	.....
1903	16,342,099	.....	.....	.....	1,353,206	352,585	27,305	.....	.....	2,138,058	.....	.....	94,188
1904	17,226,240	.....	.....	.....	1,856,225	390,425	910	.....	.....	5,097,853	.....	.....	204,890
1905	15,253,845	.....	.....	.....	1,373,030	419,212	18,530	.....	.....	8,882,125	.....	.....	700,450
1906	12,825,166	.....	.....	.....	680,756	307,550	11,800	.....	.....	8,401,105	.....	.....	3,402,800
1907	12,346,014	.....	.....	.....	2,415,840	704,805	149,944	.....	.....	8,996,268	.....	.....	4,799,411
1908	13,803,579	.....	.....	.....	3,076,300	1,463,510	434,578	.....	.....	10,725,795	.....	.....	8,249,226
1909	14,508,242	.....	.....	.....	5,807,360	1,999,701	2,234,455	.....	.....	15,406,619	.....	.....	8,699,350
1910	14,776,435	.....	.....	.....	5,471,613	9,218,904	11,174,207	.....	4,900	18,646,570	.....	.....	8,017,455
1911	14,078,890	.....	.....	.....	5,477,532	5,559,089	21,584,602	.....	168,410	18,311,251	.....	.....	7,607,830
1912	12,446,445	.....	.....	.....	5,094,465	5,590,824	25,948,980	.....	2,680,961	19,546,122	.....	.....	7,465,074
1913	9,980,940	.....	.....	.....	4,496,542	5,984,651	33,040,129	.....	5,274,553	18,604,626	.....	.....	6,801,966
1914	7,030,545	.....	.....	.....	3,820,857	12,546,615	37,479,228	.....	4,830,921	15,925,887	.....	.....	5,817,711
1915	8,094,673	.....	.....	.....	3,585,899	6,006,607	33,614,396	.....	4,310,476	13,567,380	.....	.....	4,303,080
1916	8,539,973	.....	.....	.....	3,347,166	6,768,658	32,404,213	.....	4,873,501	14,393,437	.....	.....	4,466,200
1917	8,593,034	.....	.....	.....	3,275,529	7,072,333	30,022,102	.....	6,359,421	15,898,912	.....	.....	4,342,605
1918	8,060,256	.....	.....	.....	3,060,572	6,608,940	28,222,640	.....	5,462,857	16,360,225	.....	.....	5,956,057
1919	7,630,937	.....	.....	.....	2,837,324	5,589,885	26,608,703	281,019	4,661,011	16,408,329	.....	.....	7,180,174
1920	7,457,810	.....	.....	.....	2,600,763	5,423,781	25,333,815	7,275,809	4,158,559	15,697,035	.....	.....	6,055,448
1921	6,700,420	.....	.....	.....	3,070,369	4,613,965	24,159,423	18,085,425	3,260,931	12,522,157	.....	.....	5,782,426
1922	7,317,238	.....	.....	.....	3,417,434	5,542,816	24,152,026	11,891,030	2,814,824	9,159,368	.....	.....	5,465,262
1923	6,816,134	.....	.....	.....	2,191,702	5,235,889	22,567,392	8,174,371	1,843,483	5,210,839	128,674	.....	3,797,903
1924	6,773,321	.....	.....	.....	2,094,598	6,136,213	31,328,676	13,589,611	1,526,371	10,144,428	342,357	.....	3,003,672
1925	5,901,877	.....	.....	.....	2,091,971	6,209,736	30,713,666	11,971,149	1,730,140	7,751,107	344,760	.....	2,857,495
1926	4,312,171	46,225	.....	.....	1,961,028	6,444,711	27,524,044	12,292,754	1,693,666	7,295,807	371,981	.....	2,596,581
1927	6,098,582	40,277	.....	8,700	1,855,602	6,122,953	25,547,755	10,073,073	1,515,300	7,154,599	374,734	.....	1,852,356
1928	5,071,284	53,977	133,433	44,455	1,805,485	5,493,979	21,320,114	8,107,198	1,526,491	4,655,284	199,699	329,48b	2,041,499
1929	6,089,344	1,826,056	594,498	223,734	1,708,520	6,050,870	19,260,106	6,353,035	1,602,425	3,558,843	1,951,786	250,156	1,535,815
1930	5,349,915	3,883,924	903,337	1,194,832	1,489,628	8,035,870	15,451,277	6,572,379	1,313,475	3,373,078	6,209,357	219,237	1,152,892
Grand total	282,519,120	5,850,459	1,631,268	1,471,721	80,472,363	142,263,695	550,741,304	114,666,853	61,612,676	316,155,864	8,360,842	2,361,384	126,248,878

Year	Capitan	Summerland	Elwood	Santa Barbara	Rincon	Ventura Avenue	Ventura-Newhall	Los Angeles and Salt Lake	Whittier	Fullerton	Coyote	Santa Fe Springs	Montebello
Prior to 1876 down to 1893	.....	.....	.....	.....	.....	.....	4,769,450	.....	.....	.....	.....	.....	.....
1894	.....	1,500	.....	.....	.....	.....	570,469	196,094	.....	.....	.....	.....	.....
1895	.....	16,904	.....	.....	.....	.....	474,624	749,695	.....	.....	.....	.....	.....
1896	.....	39,792	.....	.....	.....	.....	298,866	902,868	.....	.....	.....	.....	.....
1897	.....	130,136	.....	.....	.....	.....	631,135	1,064,158	.....	12,000	.....	.....	.....
1898	.....	132,217	.....	.....	.....	.....	763,871	1,126,000	.....	60,000	.....	.....	.....
1899	.....	203,370	.....	.....	.....	.....	743,998	1,052,036	.....	217,599	.....	.....	.....
1900	.....	183,486	.....	.....	.....	.....	628,734	1,280,000	.....	511,550	.....	.....	.....
1901	.....	203,616	.....	.....	.....	.....	495,943	1,830,000	.....	753,198	.....	.....	.....
1902	.....	136,252	.....	.....	.....	.....	646,496	2,027,000	.....	1,103,793	.....	.....	.....
1903	.....	131,125	.....	.....	.....	.....	682,185	793,765	.....	2,305,613	.....	.....	.....
1904	.....	120,506	.....	.....	.....	.....	650,779	1,241,304	.....	2,224,550	.....	.....	.....
1905	.....	96,871	.....	.....	.....	.....	476,898	2,226,768	.....	2,118,312	.....	.....	.....
1906	.....	72,810	.....	.....	.....	.....	404,379	2,675,650	.....	2,434,512	.....	.....	.....
1907	.....	69,060	.....	.....	.....	.....	435,584	3,372,465	.....	3,294,206	.....	.....	.....
1908	.....	67,862	.....	.....	.....	.....	498,015	5,138,959	.....	4,273,314	.....	.....	.....
1909	.....	66,338	.....	.....	.....	.....	516,628	4,350,898	.....	5,157,252	.....	.....	.....
1910	.....	74,725	.....	.....	.....	.....	652,575	3,729,618	.....	6,281,221	.....	.....	.....
1911	.....	71,255	.....	.....	.....	.....	661,785	3,223,661	.....	7,081,165	.....	.....	.....
1912	.....	65,715	.....	.....	.....	.....	359,885	3,073,427	747,439	5,813,037	1,359,303	.....	.....
1913	.....	62,406	.....	.....	.....	.....	1,022,052	2,898,846	690,133	6,139,561	3,777,359	.....	.....
1914	.....	55,743	.....	.....	.....	.....	968,421	2,504,475	636,789	6,495,100	6,998,659	.....	.....
1915	.....	55,800	.....	.....	.....	.....	1,028,106	2,094,194	758,163	5,505,999	6,610,508	.....	.....
1916	.....	53,500	.....	.....	.....	2,650	1,083,635	1,729,761	1,014,667	4,806,104	8,588,699	.....	.....
1917	.....	54,000	.....	.....	.....	7,100	1,129,817	1,453,161	1,156,752	4,527,875	11,458,471	.....	789,635
1918	.....	54,000	.....	.....	.....	23,609	1,373,213	1,347,471	1,046,467	4,361,751	12,614,598	.....	6,839,267
1919	.....	54,000	.....	.....	.....	38,425	1,734,762	1,323,021	1,001,048	4,349,376	10,240,359	.....	12,100,784
1920	.....	54,000	.....	.....	.....	105,185	1,944,630	1,320,573	842,184	5,237,044	8,732,435	.....	11,124,585
1921	.....	54,000	.....	.....	.....	127,674	1,975,473	1,314,213	735,376	5,962,008	7,419,050	208,216	9,065,723
1922	.....	48,339	.....	.....	.....	685,247	2,330,630	1,258,287	717,729	4,512,974	7,000,373	11,032,955	6,692,024
1923	.....	52,862	.....	.....	1,423,187	2,279,217	1,192,036	645,219	4,064,661	2,447,825	79,781,275	4,075,669
1924	.....	53,201	.....	.....	1,831,903	2,188,266	907,453	761,211	4,120,789	5,683,559	26,399,655	6,230,299
1925	.....	48,351	.....	.....	6,999,403	2,264,069	731,912	742,676	4,481,443	7,140,004	18,969,528	6,843,194
1926	.....	46,865	.....	.....	14,795,495	2,204,381	675,950	746,125	6,987,489	6,030,619	17,446,709	6,515,493
1927	.....	49,475	86,840	.....	5,923	17,808,704	2,197,644	630,600	660,505	7,008,934	5,146,864	15,153,578	5,498,252
1928	.....	44,853	895,152	.....	1,082,735	18,920,942	2,096,343	560,607	612,126	5,743,044	4,901,998	16,093,931	4,369,638
1929	2,795	93,826	9,435,819	10,868	1,192,237	20,934,388	1,856,706	552,614	563,790	4,813,942	4,176,035	76,477,464	3,657,922
1930	25,295	118,042	14,606,007	12,851	1,003,204	17,493,155	1,772,131	545,959	516,802	4,423,266	3,890,047	44,251,396	2,712,725
Grand total	28,090	2,942,103	25,023,818	23,719	3,284,099	101,197,077	47,311,795	63,095,499	14,595,201	137,232,682	124,216,765	305,814,707	86,515,210

	Richfield	Huntington Beach	Long Beach	Torrance	Dominguez	Rosecrans	Inglewood	Newport	Seal Beach	Potrero	Lawndale	Playa Del Rey	Watsonville Miscellaneous	Total all fields
Prior	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,769,450
1894	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,715	783,078
1895	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,116	1,245,339
1896	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,135	1,257,780
1897	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,000	1,911,569
1898	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,000	2,249,088
1899	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,500	2,677,875
1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	248,945	4,319,950
1901	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,710,315
1902	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,356,910
1903	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,670	24,334,481
1904	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39,392	29,548,634
1905	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29,650	34,298,041
1906	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,090	32,623,229
1907	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69,090	40,102,512
1908	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	125,475	48,306,737
1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	126,775	58,191,723
1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58,970	77,697,568
1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61,350	83,744,044
1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45,870	90,074,439
1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,375	97,867,184
1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,375	103,623,695
1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,375	89,725,776
1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,450	91,976,019
1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,375	97,781,574
1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,375	102,643,415
1919	965,408	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,375	101,907,729
1920	2,565,348	38,116	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25,610	105,618,706
1921	3,306,962	2,518,812	75,588	.....	.....	.....	.....	.....	.....	.....	.....	.....	25,854	114,566,901
1922	3,314,538	11,169,383	18,560,595	190,785	.....	.....	.....	.....	.....	.....	.....	.....	20,338	139,626,876
1923	5,121,335	34,355,642	68,810,361	3,128,694	157,698	.....	.....	.....	.....	.....	.....	.....	21,058	263,728,895
1924	4,457,679	17,532,520	60,122,002	17,226,123	6,811,531	611,432	10,445	.....	.....	.....	.....	.....	20,979	230,063,117
1925	4,318,488	15,887,474	40,173,375	13,242,113	13,328,817	7,263,466	18,348,395	32,661	.....	.....	.....	.....	20,986	230,147,342
1926	5,574,244	19,064,814	37,931,964	10,354,905	7,801,586	6,114,430	17,390,131	32,973	587,107	.....	.....	.....	20,990	224,117,013
1927	7,884,042	26,344,697	34,541,667	8,338,928	5,887,645	3,506,116	12,751,556	12,485	16,424,929	571	.....	.....	20,871	230,751,463
1928	6,798,673	19,642,278	62,467,103	6,454,067	4,267,009	2,392,325	10,762,797	13,146	12,436,371	107,380	15,686	.....	22,010	231,982,597
1929	5,776,358	16,007,030	60,495,555	5,000,218	3,606,850	2,463,808	8,768,101	15,330	14,418,305	271,446	392,533	25,121	22,762	292,036,911
1930	3,643,578	11,108,203	36,599,688	4,116,846	3,694,075	2,435,341	6,429,205	14,600	8,026,796	638,268	130,472	4,719,981	22,764	228,099,899
Grand total	64,626,541	173,669,969	419,777,898	68,352,689	45,555,211	24,786,718	74,460,630	121,195	51,893,508	1,017,665	538,691	4,745,102	1,284,665	3,536,467,874

SOUTHWEST TEXAS PROVEN AREAS

(Continued from Page 48)

United Prod.'s No. 34 Ray, T. Hanson Sur. ....T. D. 3,953 ft.; showed oil and gas on drill stem test.

LASATER POOL—BROOKS COUNTY

Houston Oil Co.'s No. 3 Wormser, Maguella Sur. ....T. D. 3,500 ft.; drlg.

CARTWRIGHT POOL—LIVE OAK COUNTY

Houston Oil Co.'s No. 3 B. L. and C. C. ....T. D. 5,576 ft.; drill stem stuck.
Houston Oil Co.'s No. 3 Dunning, M. B. Kilvin Sur.....Moving in rig.
Houston Oil Co.'s No. 4 B. L. and C. C. ....T. D. 4,856 ft.; coring.

CHITTIM POOL—MAVERICK COUNTY

Texas Gas Utilities Co.'s No. 6 Chittim, Sec. 116, Blk. 7, I.&G.N. Sur. ....T. D. 4,135 ft.; drlg.
Texas Gas Utilities' No. 7 Chittim, I.&G.N. Sur. ....T. D. 3,130 ft.; setting 10-in. csg

AGUA DULCE FIELD—NUECES COUNTY

South Texas Production Co.'s No. 9 Walter, 800 ft. from S line, 460 ft. from E line of Walter tract, in Sec. 34 ....T. D. 1,984 ft.; completed; 30,000,000 ft.
Houston Oil Co.'s No. 1-B Ollie Purl ....T. D. 5,200 ft.; drlg.
Houston Oil Co.'s No. 1 Comstock, Sec. 86, Benton Pasture Sur. ....T. D. 4,913 ft.; completed; 30 bbls. gasoline, 40,000,000 ft gas.

SAXET FIELD—NUECES COUNTY

O. C. Best et al's No. 1 Boory ....T. D. 3,000 ft.; drlg.
Houston Oil Co.'s (Andy Bowen) No. 1 Prieur, H. B. Sheppard Sur. ....T. D. 1,465 ft.; waiting for csg.
Moody-Seagraves' No. 1 Sedwick, J. Dunn Sur. ....T.D. 2,985 ft.; drilling.
W. L. Pearson Properties' No. 1 Dunn, 300 ft. S of Bay ....Shut down 2,600 ft.
Saxet Oil Co.'s No. 7 Dunn ....T. D. 3,405 ft.; drlg.

WHITE POINT FIELD—SAN PATRICIO COUNTY

United Production Co.'s No. 3 Cage ....Rigging up.

LAREDO DISTRICT

SCHOOLFIELD-O'BYRNE POOL—DUVAL COUNTY

Duval Oil Corp.'s No. 2 Bishop Cattle Co. ....T. D. 2,210 ft.; drlg.
Magnolia Pet. Corp.'s No. 2 Wilson, Sur. 134 ....Rigging up.

RANDADO POOL—JIM HOGG COUNTY

J. W. Pippin's No. 1 Hinnant, 150 ft. each way from SW cor., Blk. 11, Sur. 147 ....Derrick.

KOHLER POOL—DUVAL COUNTY

Humble Oil & Refining Co.'s No. 50 Kohler, 2,805 ft. from S line, 165 ft. from W line of Sur. 164 ....T. D. 5,116 ft.; drlg.

S. R. C. POOL—DUVAL COUNTY

S. R. C. and Vacuum's No. 3 Duval County Ranch Co., G.C.&S.F. Sur. No. 293 ....T. D. 1,830 ft.; dry and abnd.
S. R. C. and Vacuum's No. 4 Duval, County Ranch Lands Sur. 293 ....Location.

COLE POOL—WEBB COUNTY

O. W. Killam's No. 4 Cuellar ....T. D. 2,361 ft.; coring.

COLE POOL—DUVAL COUNTY

Southern Oil Co.'s No. 3 King-Harper, 1,794 ft. E line, 729 ft. N line of Sur. 323 ....Location.

REISER POOL—WEBB COUNTY

O. W. Killam's No. 1 Johnson, Sur. 1,617 ....T. D. 1,645 ft.; drlg.

CAROLINA-TEXAS POOL—WEBB COUNTY

George S. Marshall's No. 1 C. W. Webster, 810 ft. from S line, 150 ft. from W line, Sur. 684 ....T. D. 3,960 ft.; standing.

CHABCO REDONDO POOL—ZAPATA COUNTY

Midwest Public Utilities' No. 1 Zarza, 450 ft. SW line, 450 ft. SE line, Blk. 33, Pedernal grant ....T. D. 1,598 ft.; repairing boiler.

JENNINGS-MUCKELROY POOL—ZAPATA COUNTY

Allied Oil & Gas Co.'s No. 12 Guiterrez, 750 ft. from NE line, 3,663 ft. from SE line, Share 4, Fansler Partition, Comitas grant ....T. D. 100 ft.; standing.
Claypool & Nixon's No. 3 Garza, Comitas grant ....Rigging up.
Grimm & Yakey's No. 2 Bustamente, Comitas grant ....T. D. 1,394 ft.; drlg.
K. & P. Oil Co.'s No. 4 Bustamente, Comitas grant ....T. D. 1,370 ft.; testing sand.
P. H. Meyers' No. 1 Trevino, Sur. 412 ....T. D. 900 ft.; drlg.
S. R. C. Oil Co.'s No. 5-D Montemayor ....T. D. 800 ft.; drlg.
S. T. Phelps (Blankenship) No. 2 Garza, 425 ft. W line, 425 ft. E line, Blk. 2, Sur. 413 ....T. D. 1,766 ft.; drlg.
Shankle and Murray's No. 1 Cuellar, Blk. 6, Sur. 61 ....T. D. 100 ft.; drlg.
W. R. Shankle's No. 2 Garza, Comitas grant ....T. D. 1,200 ft.; drlg.

CUELLAR POOL—ZAPATA COUNTY

Brooklyn Oil Co.'s No. 1 Cuellar, Sur. 119 ....T. D. 1,525 ft.; drlg.
O. W. Killam's No. 40-C Cuellar, Sur. No. 278 ....Derrick.
A. R. McLennan's No. 2 Cuellar, Sur. 277 ....T. D. 1,460 ft.; drlg.

MIRANDO VALLEY POOL—ZAPATA COUNTY

O. W. Killam's No. 4 Killam, Blk. 11, Sur. No. 182 ....T. D. 2,160 ft.; drlg.

WILDCAT OPERATIONS IN SOUTHWEST TEXAS

(Continued from Page 48)

Mauldin et al's No. 1 Kimball, 300 ft. S Grayburg's No. 1-A Kimball, S. Winship Sur. ....T. D. 700 ft.; drlg.
E. S. Price's No. 1 Weiss, 200 ft. each way out of NW cor. of B.&B. Sur. ....T. D. 4,423 ft.; preparing to swab.
E. S. Price's No. 2 Weiss, 900 ft. due SW of No. 1 Weiss, B.&B. Sur. ....T. D. 4,546 ft.; testing.
E. S. Price's No. 3 Weiss, 900 ft. due NE of No. 1 Weiss. ..Location.
Cosden Oil Co.'s No. 1 Stoltzfus, 2,310 ft. S and E lines of Sec. 14, Rangley Subd. of C. Miller ranch, Uranga Sur. ....T. D. 4,500 ft.; shut down.
Humble and Hurlbut et al's No. 1 J. C. Wood, 150 ft. from NW line, 1,144 ft. from SW line of P. T. Irrigation Co. ....T. D. 5,077 ft.; standing.
The Texas Company's No. 1 McCampbell, 150 ft. from N and E lines of 161-ac. tract, R. Pena Sur. ....Location.
Rowan and Hope's No. 1 Goree, 600 ft. S, 300 ft. W Lot 4, T. B. Barton Sur. ....T. D. 3,050 ft.; fishing.

BEXAR COUNTY

Eckert & Son's No. 3 J. J. Brehm, 545 ft. from N line, 150 ft. from W line of lease, Sur. No. 58 ....Location.
Eckert & Son's No. 6 Brehm, 150 ft. W of No. 5 ....Location.
Eckert & Son's No. 7 Brehm, 150 ft. W of No. 6 .. ....T. D. 500 ft.; drlg.
Gatlin Oil Co.'s No. 2 I. A. Beck, 150 ft. from SE line, 2,551 ft. from SW line of lease, J. Montez Sur. ....Location.
Gatlin Oil Co.'s No. 4 Beck, Juan Montez Sur. ....Location.
Gatlin Oil Co.'s No. 5 Beck, 300 ft. SE of No. 4 ....T. D. 600 ft.; shut down.
Kaye and Uhl's No. 1 Rhode, C. Texada Sur. No. 133 ....T. D. 665 ft.; shut down.
Long and Craig's No. 1 Sandemer ....Location.
McElroy-Hall and Croach's No. 1 Sweeney, 450 ft. NW line, 700 ft. W line of tract, F. R. Hernandez Sur. ...Waiting on cement.
J. M. Russell's No. 1 F. L. Price, 1,500 ft. to N line, 660 ft. W of tract in Angel Navarro Sur. ....T. D. 1,024 ft. in chalk; shut down for csg.
Snyder, Reeves et al's No. 2 Glasscock, 12 miles NE of San Antonio ....T. D. 802 ft.; shut down.
Weibacher et al's No. 1 Ernst, 6,400 ft. S line, 900 ft. W line of J. Christopher Sur. ....T. D. 938 ft.; shut down.
Russell & Moore's No. 3 Mills, Angel Navarro Sur., No. 5 ....T. D. 660 ft.; drlg. shale.
Ueckert et al's No. 1 Palfrey, 1,000 ft. S and W lines of farm ....T. D. 1,809 ft.; shut down.
S. M. Terrell et al's No. 1 A. Beadom, 1,100 ft. from E line, 12,000 ft. from N line of John Barber Sur. ...Location.
F. W. Tong's No. 1 Willie Sandemer, 150 ft. from NE and SE lines of the N 20 acres of Willie Sandemer 400-ac. tract, Juan Montez Sur. ....T. D. 1,170 ft.; shut down.
Bowman and Waldrop's No. 1 Ridder, 1,000 ft. from S and W lines of 688-ac. tract, J. M. Sur. ....T. D. 2,000 ft.; plugged back to 600 ft.; will put on pump.
Waggoner and Stieren's No. 1 S.A.S.I.F., G. Najar Sur. ..T. D. 540 ft.; shut down.

CALDWELL COUNTY

Callihan et al's No. 3 W. H. Callihan, 70 ft. N, 65° E of No. 2 ....T. D. 2,525 ft.; shut down.
Neuhaus and others' No. 1 Moore, W. Clinton Sur. ....Rigging up.
Jim Harper's No. 1 Tabor, Pablo Martinez Sur. ....T. D. 1,900 ft.; abnd.

COMAL COUNTY

Caldwell & Lanier's No. 1 T. J. Byler, 175 varas from W line, 370 varas from N line of 320-ac. tract in the H.E.&W.T. No. 5,894 Sur. ....T. D. 600 ft.; straightreaming.

DEWITT COUNTY

H. T. Roe's No. 1 Leinhardt ....T. D. 2,170 ft.; shut down.

DUVAL COUNTY

Buchanan et al's No. 2 Wood-Welder, S. Alexander Sur. No. 102 ....T. D. 1,521 ft.; shut down.
O'Byrne et al's No. 1 Well, B.S.&F. Sur. No. 568 ....T. D. 600 ft.; drlg.

EDWARDS COUNTY

Phillips Pet. Corp.'s No. 2 A. G. Holman, 320 ft. from N and E lines of SE of tract, C.C.S.D.&N.G.R.G. Sur. No. 25 ....T. D. 7,770 ft.; drlg. lime.
James Dalgish's No. 2 Peterson, 850 ft. N line, 1,100 ft. W line of Sec. 82, Blk. E in the H.E.&W.T. Sur...Location.

FAYETTE COUNTY

Elam & Reynolds' No. 1 Florence, M. Muldoon Sur., No. 13 ....T. D. 1,040 ft.; shut down.

FRIO COUNTY

A. H. Wray's No. 1 Burns estate, 700 ft. N, 330 ft. E of C Sec. 123, Antone Hupzor ....T. D. 3,708 ft.; pulling liner.

GOLIAD COUNTY

A. G. Riemenschneider's No. 1 A. T. Fromme, 275 ft. from N line, 912 ft. W line of 300-ac. tract, P. Dexeter Sur. ....T. D. 2,330 ft.; shut down.
Gibson Oil Co.'s No. 1 Cyrus Parks, 3,000 ft. S and 2,500 ft. E of NW cor. of Parks ranch, Ferguson Sur. ....T. D. 5,267 ft.; standing.
T. B. Slick's No. 1 Poetter, 1,500 ft. from SW line, 900 ft. from SE line of 591-ac. tract, Obid Marshall Sur. ....T. D. 4,213 ft.; shut in for storage.
T. B. Slick's No. 1 Allen, Obid Marshall Sur. ....T. D. 4,212 ft.; 60 bbls. gasoline, 40,000,000 ft. gas.

GONZALES COUNTY

Acme Oil & Royalty Corp.'s No. 1 H. K. Weber, 2,525 ft. from NW line, 2,250 ft. from SW line, Wright Sur. ....T. D. 2,560 ft.; shut down.
Linden Pet. Co.'s No. 1 Cowley, James Smith Sur. ....T. D. 3,550 ft.; drlg.
Weal Oil Co.'s No. 1 Martin, 360 ft. SE line and SW line of tract, Thomas Moore Sur. ....T. D. 3,589 ft.; drlg.

GUADALUPE COUNTY

O. K. Emerson's No. 1 C. A. Phillips, center of 80-ac. tract, Velda Sur. ....Rigging up.
Luling Oil & Gas Co.'s No. 1 Nixon, E of Darst Creek, E. W. Alexander Sur. ....T. D. 2,884 ft.; drlg.
San Antonio Oil and Royalty Co.'s No. 1 Dilrell, H. and T. C. Sur. ....Location.
Schleyer, Atherton and Armstrong's No. 1 Ogletree, Robert Smith Sur. ....Derrick.

HAYS COUNTY

J. C. Jones et al's No. 1 Byder, John Ingram Sur. ....T. D. 700 ft.; drlg.

JIM HOGG COUNTY

J. D. Pulliam's No. 1 Jones, 1,020 ft. W line, 1,020 ft. S line, Share 5-A, Hinojosa Sur. ....T. D. 2,888 ft.; standing.

JIM WELLS COUNTY

Carsil Oil & Gas Co.'s No. 1 McGill, D. Baldwin Sur. ....T. D. 500 ft.; drlg.
R. H. Ewell's No. 1 Doering, Blk. 6, Seefield Subd. ....T. D. 1,100 ft.; shut down, boiler trouble.
Gulf Prod. Co.'s No. 1 Shaeffer, J. Pointevent Sur. No. 1..T. D. 1,400 ft.; drlg.
Prairie Lee Prod. Co.'s No. 1 Oppenheimer ....T. D. 600 ft.; coring.
Smith Clark Co.'s No. 1 Cuero Cattle Co. ....Location.
Stewart and Blair (E. W. Ogden) No. 1 Farris ....T. D. 2,122 ft.; setting csg.

KARNES COUNTY

J. F. Morrissey et al's No. 1 Rigsdale, 660 ft. SW of C of NE line of 170-ac. farm in the McCouli Sur. ....T. D. 2,500 ft.; drlg.
A. Edmiston's No. 1 Cochran, 150 ft. from S line, 500 ft. from E line of tract, D. B. McConnell Sur. ....T. D. 1,010 ft.; standing.
Huribut et al's No. 1 Newberry, 450 ft. SE and SW line of Newberry 428-ac. tract, Carlos Martinez Sur. ....T. D. 4,003 ft.; abnd.

KENDALL COUNTY

Borgett et al's No. 1 Haag, W. Avery Sur. ....T. D. 1,010 ft.; drlg.
Sitton et al's No. 1 Garvin, C of NE of D. L. Richardson Sur., in the D. L. Richardson Sur., 1 mile NE from Kendalia ....T. D. 1,165 ft.; shut down.
Dixon Oil Co.'s No. 1 Ottmer Behr, W of H.T.&B.R.R. Sur., 3½ miles SE from Sisterdale ....T. D. 2,600 ft.; fishing.
P. B. Sterling's No. 1 R. J. McCrocklin, 1,350 ft. from N line, 250 ft. from W line of the B. G. Owens Sur., 4 miles W from Kendalia ....T. D. 1,600 ft.; shut down.
R. M. Perkins' No. 1 J. Lawhorn, Sec. 10, 2,475 ft. E line, 1,488 ft. S line ....T. D. 706 ft.; standing.
Permian Oil Co.'s No. 1 Taylor, Sec. 18, G.B.&G. Sur. ....T. D. 100 ft.; shut down.

KERR COUNTY

Evans and Gant's No. 1 Selker-Mears, C.C.S.D.&R.G. N.G. Sur. No. 1,605 ....T. D. 285 ft.; fishing.
Evans and Gant's No. 1 E. Young, A. E. Burge Sur. No. 28 ....Drlg. water well.

KINNEY COUNTY

Marlon Oil Co.'s No. 2 Jim Clamp ....T. D. 1,389 ft.; standing.
Magnolia Petroleum's No. 1 Wardlaw, Meliton Valdez Grant ....T.D. 5,225 ft.; drilling; reinstated, previously reported abnd.

KIMBLE COUNTY

C. L. Bryant et al's No. 1 Lambert, 7,700 ft. N and W lines of F. Lotta Sur. ....T. D. 850 ft.; standing.
Kamon et al's No. 1 Hodges ....T. D. 2,505 ft.; shut down; hole full water.

LASALLE COUNTY

Fred W. Valez' No. 1 Coleman, 200 ft. from S and E lines of SW Sec. 514, B.S.&F. Sur. ....T. D. 40 ft.; standing.

LAVACA COUNTY

Cranfill & Reynolds' No. 1 Hermes, William Ryan Sur. ..T. D. 3,500 ft.; drlg.
Newton Oil Co.'s No. 1 Reeves, cor. of S line of Reeves tract, John Hueser Sur. ....T. D. 3,340 ft.; fishing.

LIVE OAK COUNTY

Jacob, Buzzini & Pickett, Inc.'s No. 1 C. E. Kay in the Bridget Fadden Sur., 3 miles E from George West ..T. D. 4,010 ft.; shut down.
Houston Oil Co.'s No. 3 Dunning, 330 ft. from NE line and 2,300 ft. from SE line of tract, M. B. Kilvin Sur...Moving in derrick.
Houston Oil Co.'s No. 1 D. W. Snyder, 630 ft. from S line, 150 ft. from E line of Snyder tract, T. E. Garner Sur. ....T. D. 5,386 ft.; coring.
Illinois Exploration Synd.'s No. 1 Reeves-Brown, 1,300 ft. S of Sellars tract, 1,800 ft. E of Ry. ....T. D. 2,145 ft.; cleaning out.
Phillips Pet. Corp.'s No. 1 Goebel, Refugio County School Land Sur. ....T. D. 2,400 ft.; drlg.
Southern Exploration Co.'s No. 1 Ponder, B.S.&F. Sur., in eastern Live Oak ....Spudded.
Sid Keoughan's No. 1 C. E. Terrell, 600 ft. from N line, 1,000 ft. from E line, Dan O'Boyle Sur. ....T. D. 2,840 ft.; shut down.

LEE COUNTY

A. H. Wheeler and associates' No. 1 fee, Blk. 47, H. Donohue Sur. ....T. D. 1,998 ft.; shut down; hole full water.

McLENNAN COUNTY

C. E. Groone et al's No. 1 League ....T. D. 1,230 ft.; shut down.

McMULLEN COUNTY

Mogul Pet. Co.'s No. 1 Martin, 150 ft. NW line, 150 ft. to SW line of E. Melon No. 212 Sur. ....T. D. 632 ft.; standing.

PARSONS

HEAVY DUTY TRENCHER

Stop that "Leapfrogging"

WHY pay the higher cost penalty of "leapfrogging" just because a machine can't go through?

Why not make the most money on your job with a trencher of the right type, with enough power and *heavy duty* ruggedness to give you extra profits on the tough stretches, as well as speed and greater profits on the easy going?

No machine "goes through" like the *Heavy Duty* Parsons—goes up the steep grades, through blasted limerock and shale, through anything within the possibility of a power-driven machine — does the deep work or the shallow, the narrow or the wide work.

N. E. C. designed to Heavy Duty standards of construction, greater than ever in power, in range of digging speeds, the Parsons cuts out "leapfrogging" to a point that means nothing less than a new profit-margin on every cross-country job!

Know the Parsons—write for bulletin of the Parsons Heavy Duty Model 35.

National Equipment Corporation

N. 30th St. & W. Concordia Ave., *Milwaukee*

A 6213-I

Neuhaus and others' No. 1 J. O. Massey, Sur. No. 472 ..Location.
Sheree, Brodie and Emick's No. 1 Shiner, Henry Brewer Sur. ....T. D. 1,170 ft.; shut down.

MEDINA COUNTY

National Oil Co.'s No. 1 Howard, 1,750 ft. E of W line, 1,854 ft. N of S line of survey in the John George Sur. No. 9, 10 miles S of Dunlay ....T. D. 2,618 ft.; shut down.
J. H. Hickey's No. 1 Odom, H. Castro Sur. No. 175 ....T. D. 800 ft.; drlg. shale.
Donaldson Oil & Gas Co.'s No. 2 Adams ....Derrick.
C. H. Florian et al's No. 1 Henry Meyer ....T. D. 200 ft.; standing.
Caldwell et al's No. 1 L. W. Burrell ....T. D. 518 ft.; standing.
M. Eskridge et al's No. 1 Medina Valley Irrigation ....T. D. 1,390 ft.; shut down.
Pat Armstrong's No. 1 Crawford, 1,389 ft. N line, 2,550 ft. E line of survey, 487.6 miles W of Devine ....T. D. 2,789 ft.; shut down.
Sunflower Oil Co.'s No. 1 Mofield, J. Brothag Sur. No. 532 ....T. D. 1,212 ft.; standing.

MILAM COUNTY

Rheubotham & Tate's No. 1 Johnson, 325 ft. from N line, 250 ft. from W line of 40-ac. tract, D. Robinson Sur. ....T. D. 2,080 ft.; fishing.
Red Bank Oil Co.'s No. 1 Foster, A. G. Berry Sur. ....Derrick.
Crawford et al's No. 1 Wall, Reuben Fisher Sur. ....T. D. 1,000 ft.; dry and abnd.
Masters and Pomeroy's No. 1 Pluger, J. J. Acosta Sur. ..T. D. 1,136 ft.; shut down.
Kyser, Roberts & Dibble's No. 2 Ward ....T. D. 2,915 ft.; shut down.
J. E. McKee et al's No. 1 Littleton, 150 ft. from N and 225 ft. from W lines of lease, C. Chevallier Sur. ....T. D. 510 ft.; shut down.
Peggie Brothers' No. 1 M. Reed ....T. D. 650 ft.; shut down.

NUECES COUNTY

Grimm et al's No. 1 William Baur ....T. D. 5,280 ft.; drlg.
H. H. Weinert's No. 1 Mohle, 450 ft. from S line, 450 ft. from W line, Sec. 94, Bishop Subd., Palo Alto lands ....T. D. 4,625 ft.; drlg.

REAL COUNTY

Evans & Sprinkle's No. 1 J. M. Auld, H.E.&W.T. Sur. No. 16 ....T. D. 2,800 ft.; drlg.
McGinley Corp.'s No. 1 Haby, C of SW Sec. 175 ....T. D. 1,350 ft.; set csg.
Gant-Kilgore and Evans' No. 1 A. D. Auld, C.C.S.D.& R.G.N.G. Sur. No. 23 ....T. D. 400 ft.; drlg.

STARR COUNTY

Los Olmos Oil Co.'s No. 2 Kelsey-Bass, Blk. 6, Porcion 77 ....T. D. 520 ft.; drlg.
Kush and Duerkson's No. 1 Kelsey-Bass, Blk. 9, Porcion 75, Carmargo Sur. ....T. D. 856 ft.; standing.
Menyard et al's No. 1 Sealbury, 150 ft. from E line, 6,550 ft. from N line, Share 5, Porcion 75, Jurisdiction of Carmargo ....T. D. 349 ft.; set 8-in. csg.

SAN PATRICIO COUNTY

George B. Pickett's No. 1 Baldwin, 900 varas due E of Denton, 1,200 ft. S of the SE cor. of O'Neill Sur., Abstract 211 ....T. D. 4,020 ft.; shut down.
Saxet Oil Co.'s No. 1 Carrol, 8 miles N of Gregory ....Derrick.

TRAVIS COUNTY

Fort Bend Oil Co.'s No. 1 Engleman, 450 ft. N line, 150 ft. W line of 108-ac. tract, J. H. Denson Sur. ....T. D. 1,500 ft.; shut down.
F. W. Fuch's No. 1 Ballersted, A. Alexander Sur. ....Location
Franklin et al's No. 1 Wilson, A. Alexander Sur. ....Derrick.
Waldron et al's No. 1 Cook, D. H. Minor Sur., 8 miles SW of Austin ....T. D. 660 ft.; shut down.
Bohls and Wilson's No. 1 Norton, J. Cole Sur. ....Derrick.

UVALDE COUNTY

Phantom Oil Co.'s No. 1 Claudt, Sec. 611 ....T. D. 2,710 ft.; shut down.
Waldrop & Welch's No. 1 E. R. Edmonds, 1,750 ft. NW, 7,200 ft. W of Sec. 71, in the A. Gomez Sur., 8 miles S of Uvalde ....T. D. 1,610 ft.; running csg.

VICTORIA COUNTY

Newton et al's No. 1 West ....T. D. 1,550 ft.; standing.
United Gas Co.'s No. 1-B McFadden, 5,700 ft. east of No. 2 Lion Refining ....T.D. 1,303 ft.; set csg.
The Texas Company's No. 2 McFadden, C. M. Boyd Sur. ..T. D. 2,300 ft.; blew out.

WEBB COUNTY

Usher Carson et al's No. 3 Benavides, 150 ft. from S and W lines of Blk. 7, Sur. 1,613 ....T. D. 854 ft.; drlg.
O. W. Killam's No. 1 Bruni, 2,490 ft. from E line, 1,170 ft. from S line of Sur. No. 77 ....T. D. 3,284 ft.; completed 1,000,000 ft. gas.

WILSON COUNTY

Stover and Wren's No. 1 John Ruess, 10,400 ft. from SW line, 2,300 ft. from NW line, O. A. Trevino Sur. No. 19 ....T. D. 1,100 ft.; shut down.

ZAPATA COUNTY

T. H. Ward's No. 1 Uribe, 150 ft. NW line, 150 ft. SW line, Blk. 8 Subd., Share 7, Partition No. 6, T. Uribe Partition of Jose V. Borrego Sur. ....Rigging up.
Benson Oil Co.'s No. 1 S. Vela, west corner of Blk. 12, Sur. No. 259 ....Derrick.
Bill Henry and others' No. 1 Gopher Trust Estate, Borrego Grant ....Rig up.
John Poppas Pool, Inc.'s No. 1 Flores, 2,977 ft. SE line, 6,000 ft. Rio Grande River, Porcion 35 ....Rigged up.
B. F. Nixon's No. 1 A. Guiterrez, 170 ft. S line, 332 ft. E line, Lot 5, Blk. 8, Partition 10, Borrego grant ....T. D. 50 ft.; standing.
John J. O'Hern's No. 2 Benavides, Villa grant ....T. D. 1,705 ft.; drlg.
Lowe and Rogers' No. 1 Benavides, Sur. No. 11, Blk. 5 ..T. D. 1,000 ft.; drlg.
Penny Prod. Co.'s No. 1 Juan V. Cuellar, Jr., et al, 175 ft. NE line, 175 ft. SE line Poppas Subd., Porcion 33 and 34, Blk. 1, Sur. 2 ....T. D. 1,966 ft.; testing.
National Oil Co.'s No. 1 Luther, 617 ft. NW line, 96 ft. NE line, Blk. 97, De Prom Subd., Porcion 6 ....T. D. 410 ft.; drlg.
National Oil Co.'s No. 2 Adams, 150 ft. from NW line and SW line, Blk. 11, Borrego grant ....T. D. 480 ft.; drlg.
Mackenzie and Talmadge's No. 1 Trevino, 400 ft. SE line, 200 ft. NE line, Blk. 6, Sur. No. 4, Porcion 2 and 3 ....T. D. 610 ft.; drlg.

ZAVALA COUNTY

Carl Cromwell's No. 1 Whitecotton, C of NW Sec. 1, A.P.&M. Sur. ....Location.
F. W. Weigand's No. 1 Gates, 1,320 ft. from N line, 220 ft. from NE cor. Sur. No. 13 ....T. D. 3,215 ft.; shut down.

GULF COAST FIELDS AND WILDCATS

(Continued from Page 50)

Humble & Valley's No. 1 Martha Remmert ....Derrick.
Humble & Valley's No. 5 Sherrod ....Location.
Humble & Valley's No. 13 Thompson ....Location.

HUMBLE—HARRIS COUNTY

LaRue, trustee's No. 1 Crane, northwest ....Derrick.
M. LaRue's No. 1 Tuffly, northwest ....Gumbo 1,405 ft.; shut down.
Rio Bravo Oil Co.'s No. 6 fee (workover), W. B. Adams Sur., 50 ft. out of SW cor. 22-acre tract ....Formerly comp. 4,409 ft. 470 bbls.; sidetracked to 4,373 ft.; set screen; comp. pumping 21 bbls. net oil.
Southern Coastal Oil Co.'s No. 2 Perkins ....Drlg. sand showing oil 2,880 ft.
Sun Oil Co.'s No. 17 Bender (workover), Adams Sur., 217 ft. E and 50 ft. S of NW cor., Lot 9 ....Reset screen 4,412 ft.; pumping water.
Sun Oil Co.'s No. 20 Bender, Adams Sur., Bender south addition, 354 ft. from E line and 50 ft. from S line of Blk. 2 ....Drlg. sand 3,801 ft.
Sun Oil Co.'s No. 21 Bender, Adams Sur., Bender South Addition, 300 ft. NW No. 15 ....Rig.
Sun Oil Co.'s No. 1 Beck, west flank ....Drlg. sand and shale 4,554 ft.
Trapshooter Oil Co.'s No. 3 Rosenbaum ....Standing 4,067 ft.
TrapshooterOil Co.'s No. 10 McNeil, northwest ....Salt 1,806 ft.; standing.

PIERCE JUNCTION—HARRIS COUNTY

Anderson & Plummer's No. 6 Whitehead (workover), J. Hamilton Sur. ....Old total depth 6,591 ft.; sidetracked and drlg. rock 3,658 ft.
Bryan Ward, trustee's No. 1 Prudential (workover) ....Set 82 ft. 3-in. screen 4,559 ft.; to pump.
Gulf Prod. Co.'s No. 1 Manchester (workover) ....Drlg. sandy shale 4,294 ft.
Gulf Prod. Co.'s No. 23 Taylor, east side, James Hamilton Sur. No. 52 (workover) ....Total depth 4,857 ft.; sidetracked to oil sand 3,976 ft.; set 2 jts. screen and tested salt water.
Navarro Oil Co.'s No. 2 Perry (D.D.), B.B.B.&C. Sur. No. 1,028, C Blk. 46 ....Drlg. blue shale 4,560 ft.
Trapshooter Reilly Oil Co.'s (formerly Mike Kouri's) No. 1 fee, B.B.B.&C. Sur. 1,028, 21 ft. from W line and 20 ft. from S line, Blk. 10 ....Total depth 4,020 ft.; sidetracked and coring hard lime and calcite 3,996 ft.
Rio Bravo Oil Co.'s No. 14-A Settegast (workover) ....Old total depth 5,045 ft.; pulling line to deepen.
Rio Bravo Oil Co.'s No. 102 G.H.&S.A., B.B.B.&C. Sur. No. 1,028, 35 ft. S of C of railroad track and 50 ft. E of No. 101 ....Drlg. gumbo and lime 2,677 ft.
Smith et al's No. 1 Bender fee, B.B.B.&C. Sur. No. 1,028, 173 ft. from E line and 14 ft. from N line of Lot 40, Jones Subd. ....Drlg. gumbo and shale 3,412 ft.
Tilton & Perot's No. 1 Gulf fee, B.B.B.&C. Sur. No. 1,028, 230 ft. from E line and 26 ft. from S line, Lot 26, Jones Subd. ....Rig.
Superior Oil Corp.'s No. 1 Boyles (workover), B.B.B.&C. Sur. No. 1,028 ....Drlg. sandy shale 4,481 ft.
Superior Oil Corp.'s No. 2 Boyles (workover), B.B.B.&C. Sur. No. 1,028 ....Total depth 3,874 ft.; to sidetrack.
Warner-Quinlan's No. 2 Minchen, B.B.B.&C. Sur. No. 1,028, 44 ft. from S line, Lot 5, and 134 ft. due W of No. 1 (Lot 7) ....Drlg. gumbo 2,856 ft.

BIG CREEK—FORT BEND COUNTY

Gulf Production Co.'s No. 43 Davis (workover), Michael Young Sur. ....Formerly comp. Nov. 27, 1927, flowing 400 bbls., 2% water, sand 3,648-73 ft.; pulling screen to deepen.

SPINDLETOP—JEFFERSON COUNTY

Yount Lee Oil Co.'s No. 146 McFaddin, P. Humphreys Sur., 2,772 ft. from W line and 2,528 ft. from N line of tract ....Rig.

HIGH ISLAND—GALVESTON COUNTY

Marrs McLean's No. 16 Cade (workover) ....Old total depth 3,759 ft.; pulling screen to deepen.
Marrs McLean's No. 20 Cade ....Rig standing.

ORCHARD—FORT BEND COUNTY

Gulf Prod. Co.'s No. 22 Moore (workover) ....Drlg. gumbo 4,602 ft.
Gulf Prod. Co.'s No. 28 Moore ....Drlg. sand and shale 3,951 ft.

HULL—LIBERTY COUNTY

Republic Production Co.'s No. 143 Dolbear, Jesse Devore Sur., 2,160 ft. from N line and 2,712 ft. from E line of lease ....Derrick.
The Texas Company's No. 4 Barrow ....Set 3 jts. 4½-in. screen 4,590 ft.; swabbing.

CLAY CREEK—WASHINGTON COUNTY

Sun Oil Co.'s No. 2 C. H. Marcus, J. F. Perry Sur., 200 ft. S of N line and midway east and west tract ....Oil sand 996 ft.; cmtd. 7-in. csg. 940 ft.
Sun Oil Co.'s No. 5 Caraway, J. F. Perry Sur., 200 ft. from W line and 600 ft. N of No. 2 ....Drlg. sand 989 ft.

ALLEN—BRAZORIA COUNTY

Mills Bennett Prod. Co.'s No. 2 Reese, Thos. and Wm. Alley League, 870 ft. in southwesterly direction along N line and 720 ft. southeasterly at right angles from said line ....Drlg. salt 4,834 ft.; top of salt 4,809 ft.
Mills Bennett Prod. Co.'s No. 2 Random, J. G. and G. W. McNeel ⅓ League, 860 ft. southwesterly along N line from NE cor. and 100 ft. southwesterly at right angles from said line ....Drlg. heaving shale 5,233 ft.

ESPERSON—LIBERTY COUNTY

Cranfill-Reynolds' No. 7 Davis, David Kokernut Sur., 100 ft. S of No. 4 ....Rig.
Cranfill-Reynolds Oil Co.'s No. 1-C Kirby fee ....Drlg. shale 5,338 ft.

HANKAMER—LIBERTY COUNTY

Gulf Prod. Co.'s No. 12 Boyt, H.&T.C. Sur. No. 22, 500 ft. E of No. 11 ....Drlg. shale and lime 3,376 ft.

SARATOGA—HARDIN COUNTY

Rio Bravo Oil Co.'s No. 109-A Cotton ....Drlg. shale and lime 552 ft.
Rio Bravo Oil Co.'s No. 111-A Cotton ....Location.

MOSS BLUFF—LIBERTY AND CHAMBERS COUNTIES

Gulf Prod. Co.'s No. 3 McFaddin, east flank ....Drlg. shale and lime 5,852 ft.
Humble Oil & Ref. Co.'s No. 2 Breeding, northwest flank..Cmtd. 13⅜-in. csg. 2,741 ft.
Humble Oil & Ref. Co.'s No. 7 Sterling, east flank ....Drlg. shale 5,616 ft.
Humble Oil & Ref. Co.'s No. 2 Sergeant, east flank ....Drlg. sandy shale 5,015 ft.
Texas Gulf Sulphur Co.'s No. 2 W. A. Carter, B. M. Spinks Sur., 203 varas N along E line of 54.2-acre tract from SE cor. and 19 varas W at right angles..No report.
Texas Gulf Sulphur Co.'s No. 3 W. A. Carter, B. M. Spinks Sur., 300 varas E along N line 60-acre tract from NW cor. of tract and 50 varas E at right angles ....Location.

REFUGIO—REFUGIO COUNTY

Houston Oil Co.'s No. 14 Pratt-Hewitt-Rooke ....Drlg. shale and lime 4,984 ft.
Houston Oil Co.'s No. 5 Wilson Heard (workover) ....Old total depth 3,686 ft.; pulling liner and screen to deepen.
Houston Oil Co.'s No. 4 Mrs. M. H. Ryals ....Sand and shale showing oil 3,654-64 ft.; pulling liner and screen.
Houston Oil Co.'s No. 1 Rooke ....Coring sand showing oil 6,402 ft.
Houston Oil Co.'s No. 1 Doughty ....Sand 6,452-65 ft.; set 23 ft. screen; tested salt water; pulled screen and cmtd. bottom of hole; fishing.
Houston Oil Co.'s No. 3 Rose Lambert ....Drlg. sticky shale and lime 4,763 ft.
Houston Oil Co.'s No. 1 O'Brien (D.D.), Blk. 5 ....Failed to pull lines and screen 5,434 ft.; to sidetrack.
Ed Jones' No. 3 Mitchell, 200 ft. SW Mission River and 250 ft. SE of road in Blk. 13 ....Total depth 6,486 ft. in salt water sand; plugged to 6,422 ft.; cmtd. 6⅝-in. csg. and screen.
Luling Oil & Gas Co.'s No. 1 City, Blk. 86 ....Oil sand 6,452-59 ft.; cmtd. 6⅝-in. csg. 6,452 ft.
Moody-Seagraves-Karona's No. 1 F. Hayser ....Oil sand 6,419-37 ft.; cmtd. 5 3/16-in. csg. 6,425 ft.; drilled plug and set 21 ft. 9-in. screen; bailed salt water; abandoned.
Moody-Seagraves Prod. Co.'s No. 6 Morgan-O'Connor ....Sand showing oil, total depth 6,434 ft.; cmtd. 6⅝-in. csg. 6,426 ft.; drilled plug and coring salt water sand 6,442 ft.
Moody-Seagraves Prod. Co.'s No. 7 O'Connor ....Shut down for repairs 5,730 ft.
Moody-Seagraves Prod. Co.'s No. 2-A J. F. B. Heard ....Rig standing.
Moody-Seagraves and Phillips Petroleum Co.'s No. 2 Mercy Academy, 167 ft. from N line and 666 ft. from E line of tract ....Drlg. sand and shale 5,362 ft.
Moody-Seagraves Prod. Co.'s No. 1 Shelly ....Drlg. shale 3,125 ft.
T. P. Morgan's No. 1-B St. John heirs, 200 ft. from N line and 1,558 ft. from E line of lease ....Total depth 5,517 ft.; pulled back to sand 5,477-80 ft.; cmtd. 6⅝-in. csg. 5,405 ft.
Pearson Properties, Inc.'s No. 4 Ryals, Refugio Town tract, 150 ft. from S line and 190 ft. from W line of Ryals tract ....Drlg. broken sandy lime 4,175 ft.

Ed Price's No. 3 Mission River, Refugio Town tract, 750 ft. up river from No. 2 on S bank of river ..... Rig.
Saxet's No. 4-A Wilson Heard (workover) ..... Cmtd. 4½-in. csg. in hard sand rock 3,654 ft.

L. L. Smith's No. 2 Rogers, James Power Sur..... Drlg. lime rock 5,137 ft.
United Prod. Corp.'s No. 3 Fox (workover) ..... Drill stem stuck 5,240 ft. sidetracked at 4,000 ft. and drlg. sandy lime 4,240 ft.
United Prod. Corp.'s (Union) No. 11 Fannie Heard ..... Fishing drill stem 5,780 ft.
United Prod. Corp.'s No. 12 Fannie Heard ..... Location.
United Prod. Corp.'s (Union) No. 2 Moss-Powers, Blk. 109 ..... Derrick.
United Prod. Corp.'s No. 9 O'Brien, 150 ft. S of S line and 175 ft. E of extended W line of Moody-Seagraves' O'Brien "B" lease ..... Derrick.
United Prod. Corp.'s No. 10 O'Brien, 150 ft. E of E line of Blk. 106, Refugio Townsite, and 428 ft. N of Refugio Town Tract Sur. ..... Cmtd. 12½-in. csg. 1,771 ft.
United Prod. Corp.'s No. 11 O'Brien, 200 ft. from E line and 500 ft. N of extreme S line of lease ..... Drlg. shale 1,320 ft.
United Prod. Corp.'s No. 3 Powers, Refugio Town tract, 250 ft. W of E line and 300 ft. N of S line of lease (workover) ..... Coring sandy shale 6,444 ft.
United Prod. Corp.'s No. 6 Power, S Blk. 83, Refugio Townsite ..... Location.
United Prod. Corp.'s (Union) No. 2-A Rose Lambert, 200 ft. out of SE cor, Blk. 1, of town tract ..... Drlg. rock 878 ft.
United Prod. Corp.'s No. 2 Mitchell (workover), 150 ft. out of NW cor. Mitchell 150-acre tract ..... Drlg. hard shale 6,140 ft.
United Prod. Corp.'s No. 4 Mitchell (workover), 150 ft. out of NE cor. Mitchell 150-acre tract ..... Drlg. shale 6,334 ft.

SOUTH LOUISIANA FIELDS

LOCKPORT—CALCASIEU PARISH

Union Sulphur Co.'s No. 2 Martha Moss ..... Drlg. gumbo 4,631 ft.
Vacuum Oil Co.'s No. 9 Bordages ..... Drlg. shale and lime 6,486 ft.
Vacuum Oil Co.'s No. 31 Miller ..... Oil sand 4,380 ft.; cmtd. 7-in. csg.
Vacuum Oil Co.'s No. 7 State, 319 ft. N and 260 ft. W SE cor. NE Sec. 8-10s-9w ..... Rig.

EDGERLY—CALCASIEU PARISH

Associated Oil Co.'s No. 5 Paraffine ..... Set 1 jt. 3-in. screen 3,714 ft.; bailed salt water; temp. shut down.
Rex Pet. Co.'s No. 2 Prairie Narroni, Sec. 21-9s-11w, 365 ft. from S line and 50 ft. from E line of lease ..... Drlg. sand and boulders 1,600 ft.

HACKBERRY—CAMERON PARISH

R. E. Seiss' No. 2 J. M. Vincent ..... Shut down 510 ft.
The Texas Company's No. 6 State ..... Derrick.
Yount Lee Oil Co.'s No. 34 State ..... Location.
Yount Lee Oil Co.'s No. 36 State ..... Location.
Yount Lee Oil Co.'s No. 37 State ..... Location.
Yount Lee Oil Co.'s No. 38 State ..... Location.
Yount Lee Oil Co.'s No. 39 State ..... Location.

VINTON—CALCASIEU PARISH

Gulf Production Co.'s No. 6 Gardner, 350 ft. N and 554 ft. W of SW cor. SE NE, Sec. 33-10s-12w..... Rig.
Vinton Pet. Co.'s (Lucky Ten) No. 1 Lizzo ..... Total depth 3,326 ft.; drlg. sidetracked hole in sand and shale showing oil 3,140 ft.
Vinton Pet. Co.'s No. 10 Matilda Gray (workover) ..... Set 1 jt. 3-in. screen 3,508 ft.; bailing.
Wilson-Broach's No. 2 Wilson (workover), 280 ft. N and 126 ft. E, SW cor. SE NE, Sec. 33-10s-12w..... Pulling screen to deepen; old total depth 3,617 ft.
Wilson-Broach's No. 8 Wilson, Sec. 33-10s-12w, 100 ft. N of Gulf's No. 70 G.&N.G. ..... Rig.

BAYOU BOUILLON—ST. MARTIN PARISH

Humble Oil & Ref. Co.'s No. 1 Woodyard Lake ..... Total depth 6,061 ft.; sidetracking in sandy lime 5,590 ft.
Humble Oil & Ref. Co.'s No. 4 State ..... Drlg. hard sand 4,480 ft.

SWEET LAKE—CAMERON PARISH

Magnolia Pet. Co.'s No. 2 Sweet Lake, Sec. 5-13s-7w ..... Drlg. 2,112 ft.
Pure Oil Co.'s No. 10 Yount Lee ..... Sand showing oil 6,805-30 ft.; cmtd. 8⅝-in. csg. 6,796 ft.; drilled plug and setting screen.

PORT BARRE—ST. LANDRY PARISH

The Texas Company's No. 9 Botney Bay ..... Drlg. 856 ft.

SORRENTO—ASCENSION PARISH

Gulf Ref. Co.'s No. 19 United Land Co. ..... Drlg. gumbo 3,210 ft.

SULPHUR—CALCASIEU PARISH

Union Sulphur Co.'s No. 749 fee (workover) ..... Total depth 5,316 ft. in salt; sidetracked to sandy shale showing oil 4,108-19 ft.; set 11 ft. 4½-in. screen; flowed short time; rig up to pump.
Union Sulphur Co.'s No. 762 fee (workover) ..... Fishing drill stem 5,500 ft.
Union Sulphur Co.'s No. 765 fee, Sec. 29-9s-10w ..... Rig.
Union Sulphur Co.'s No. 766 fee, Sec. 29-9s-10w ..... Drlg. sand and boulders 1,402 ft.

BLACK BAYOU—CAMERON PARISH

Shell Pet. Corp.'s No. 12 Watkins (workover) ..... Pulling screen 5,321 ft.
Shell Pet. Corp.'s No. 16 Watkins, Sec. 18-12s-12w, 1,590 ft. from E line and 1,610 ft. from N line ..... Sand showing oil 4,213 ft.; cmtd. 6⅝-in. csg.; drilled plug to set screen.
Shell Pet. Corp.'s No. 2 State, Sec. 18-12s-12w, 1,345 ft. from E line and 1,565 ft. from N line ..... Salt 4,207-4,435 ft.; shut down; waiting orders.

MISCELLANEOUS WILDCATS

TEXAS

AUSTIN COUNTY

Empire Gas & Fuel Co.'s No. 1 Kuntze, San Felipe ..... Sand 6,210 ft.; reaming.
O'Hara et al's No. 1 Schrader ..... Shut down 3,342 ft.

BRAZORIA COUNTY

The Texas Company's No. 1 Ewin, Harvey Little Sur. ... Total depth 7,584 ft.; sidetracked to shale 7,481 ft.; fishing bit.
Faust et al's No. 5 Faust ..... Set 48 ft. 4½-in. perforated pipe 6,220 ft.; flowed fresh water; fishing wash pipe.
Freeport Sulphur Co.'s No. 2,001 fee, Bryan Heights .... Heaving shale 5,260 ft.; reaming.
Layne et al's No. 7-A Wisdom, Damon Mound ..... Reaming 3,557 ft.
Amerada Pet. Corp.'s (Rycade) No. 2 Seaburn, Stratton Ridge ..... Drlg. hard shale 6,996 ft.
United Oil Syndicate's No. 1 Speer, A. A. Talmadge Sur.. Drlg. shale 1,602 ft.

BURLESON COUNTY

Paul Doran et al's No. 1 Sparks, H. E. Davis Sur., 6,700 ft. from S line of survey and 1,600 ft. W of Brazos River ..... Fishing 1,300 ft.
Mid-South Oil Co.'s No. 1 Duckworth ..... Tested brackish water 2,601 ft.; shut down.
Reynolds Oil Co.'s No. 1 Harris, 500 ft. from W line and 400 ft. from N line of J. M. McKean Sur. ..... Shut down 400 ft.

CALHOUN COUNTY

The Texas Company's No. 1 Smith, J. Timmons Sur., Will Mousin and Driscoll Sub. ..... Drlg. sand and boulders 1,036 ft.

COLORADO COUNTY

A. H. Eaton et al's No. 1 A. R. Sureck ..... Shale 2,057 ft.; shut down.

GRIMES COUNTY

Deerings & Noble's No. 1 Templeton, 6 miles south of Navasota ..... Shut down in water sand 4,559 ft.

HARRIS COUNTY

Gulf States Oil Co.'s No. 1 Angsperger ..... No report.
Humble Oil & Ref. Co.'s No. 4 Minnetex, Mykawa ..... Heaving shale 6,501 ft.; reaming.
Humble Oil & Ref. Co.'s No. 5 Minnetex, Mykawa, 150 ft. from S line and 200 ft. from W line, Lot 261, Wm. Lovett Sur. ..... Location.
Sloane Prospecting Co.'s No. 2 Ulrich, Cedar Bayou..... Abandoned in sticky shale 5,510 ft.

JACKSON COUNTY

Chicago-Gulf Co.'s No. 1 Rogers (workover) ..... Rig up to deepen 3,662 ft.
Warner-Quinlan's No. 1 Hungerford, Henry Smith Sur.... Drlg. rock 4,300 ft.

JEFFERSON COUNTY

Humble Oil & Ref. Co.'s No. 1 McFaddin, T.&N.O. Sur. 234 ..... Drlg. sandy shale 5,350 ft.
Keith et al's No. 1 Reed-Hankamer ..... Drlg. sand and shale 3,512 ft.
The Texas Company's No. 4 Pipkin, Big Hill ..... Drlg. shale 4,696 ft.

LIBERTY COUNTY

Hamm et al's No. 1 Harvard, Davis Hill ..... Gumbo 1,015 ft.; shut down.
J. R. Ingram's No. 1 Hornbeck, Clayton, Harper Sur. .... Drlg. shale 6,616 ft.
Tucker et al's No. 1 Bell, H.&T.C. Sur. No. 4 ..... Gumbo 560 ft.; shut down.

MATAGORDA COUNTY

H. C. Cockburn's No. 2 Hawkins, Shepherds Mott ..... Set 47 ft. 4½-in. screen 5,221 ft.; tested salt water; standing.
Empire Gas & Fuel Co.'s No. 1 Boker, Citrus Grove .... Total depth 6,295 ft.; drlg. sidetracked hole in sand and shale 6,250 ft.

MONTGOMERY COUNTY

John Deering et al's No. 1 Knight, D. F. Wilden Sur., 125 ft. out of SE cor., J. A. Knight 320-acre tract.... Drlg. sticky shale 3,556 ft.
Lake Creek Oil Co.'s No. 1 Hunt, south of Conroe ..... Shut down 678 ft.; gumbo.
Price & Wilhite's No. 2 Guerges ..... Drlg. sand 3,596 ft.

ORANGE COUNTY

Gulf Prod. Co.'s No. 1 Miller Vidor Lbr. Co., E Lewis Sur. No. 385 ..... Abandoned in sand and shale 6,532 ft.
Crew Oil Co.'s No. 1 Mansfield ..... Drlg. gumbo 1,200 ft.

SAN JACINTO COUNTY

Arkansas Fuel Oil Co.'s No. 1 A. J. McMurry, A. P. Gardner Sur., 1,255 ft. from N line and 1,945 ft. from W line ..... Rig.
E. P. Edwards et al's No. 1 Bennett, northwest of Cold Springs ..... Spudded and shut down.

TYLER COUNTY

King Oil Co.'s No. 1 Caswell ..... Sand and shale showing oil 1,255 ft.; cmtd. 6-in. csg. 1,218 ft.
Allied Pet. Co.'s (Texas Southern Pet. Co.'s) No. 3 Wilson, Mrs. E. Cherry Sur. No. 798, 1,500 varas from W line and 600 varas from N line ..... Drlg. sand and boulders 4,630 ft.
Lew Wentz' No. 1 Long Bell, 800 varas E and 100 varas N from SW cor. James Seals Sur. ..... Drlg. sand 1,186 ft.

VICTORIA COUNTY

Newton et al's No. 1 West ..... Shut down 1,550 ft.
The Texas Company's No. 2 McFaddin, C. M. B. Hoyd Sur. ..... Gas well; shut in 2,025 ft.
United Gas Corp.'s No. 1-B McFaddin, M. Travisea Sur., 3,700 ft. E and 500 ft. N from NE cor. C. O. Edwards Sur. ..... Cmtd. surface csg. 1,303 ft.

WASHINGTON COUNTY

Penn-Tex Oil Co.'s No. 2 Kamas Brenham, S. M. Williams Sur. ..... Cleaned hole 960 ft.; preparing to resume drlg.
Vegua Oil Co.'s No. 1 P. Graves, S. Clampet Sur. ..... Rig.
Oliver Drlg. Co.'s No. 1-A Hahn, J. H. Alcorn Sur. A-3 .. Drlg. sand and shale 1,830 ft.

WHARTON COUNTY

H. H. Givans' No. 2 Hudgins ..... Changing rigs 1,344 ft.

SOUTH LOUISIANA

CALCASIEU PARISH

Crawford Doyle's No. 1 Johnson, Sec. 23-9s-13w ..... Shut down 875 ft.
J. O. Davis' No. 1 Industrial, Sec. 29-9s-10w ..... Set 6⅝-in. csg. with 172 ft. 6⅝-in. screen on bottom, 6,568 ft.; drilled plug and bailed dry; standing.
Wilfred Lahay's No. 1 Jardell, Sec. 16-10s-12w ..... Shut down 3,258 ft.
Dr. Thomas et al's No. 1 John Hewitt ..... Location.

CAMERON PARISH

Vacuum Oil Co.'s No. 2 Cameron Meadows, 3,120 ft. S and 1,900 ft. W from NE cor., Sec. 21-14s-9w (500 ft. S No. 1) ..... Drlg. sticky shale 1,160 ft.
The Texas Company's No. 7 State, Calcasieu Lake ..... Location.

IBERIA PARISH

The Texas Company's No. 6 Vermillion Bay ..... Drlg. rock 3,620 ft.
Jefferson Lake Oil Co.'s No. 10 Lake Peigneur, Jefferson Island ..... Set 84 ft. 4½-in. perforated pipe 1,889 ft.; bailed 15 bbls. daily 21.4 gravity oil; to pump.
Jefferson Lake Oil Co.'s No. 11 Lake Peigneur, Jefferson Island ..... Derrick.

IBERVILLE PARISH

Gulf Ref. Co.'s No. 1 Gay, Bayou Choctou ..... Sandy shale 4,040 ft.; sidetracked stuck drill stem 3,960 ft.; drlg. 3,989 ft.
Standard Oil Co.'s No. 7 Wilbert, Bayou Blue ..... Derrick.
Standard Oil Co.'s No. 9 Wilbert, Bayou Des Glaise, 700 ft. E and 760 ft. N of SW cor. SE SW Sec. 78-8s-8e.. Building derrick.
Standard Oil Co.'s No. 2 Case, Bayou Des Glaise ..... Location.
Standard Oil Co.'s No. 1 E. B. and S. P. Schwing, Bayou Blue ..... Gumbo 5,433 ft.
Standard Oil Co.'s No. 1 Baist Cooperage, Bayou Blue.... Drlg. gumbo 1,566 ft.

JEFFERSON DAVIS PARISH

H. T. McClain et al's No. 1 Trimble Atterbury, Welsh, Sec. 16-9s-5w ..... Drlg. packed sand 5,229 ft.
A. V. Peters' No. 1 Smith Subd., Welsh, 1,050 ft. N and 180 ft. E SW cor. Sec. 22-9s-5w ..... Location.

PLAQUEMINES PARISH

Gulf Ref. Co.'s No. 2-B Buras Levee Board ..... Drlg. cap rock 2,311 ft.
Humble Oil & Ref. Co.'s No. 2 Cockrell-Horan, Lake Grand Ecaille ..... Drlg. sticky shale 5,020 ft.
The Texas Company's No. 5 State, Garden Island ..... Location.

ST. JAMES PARISH

Convent Oil Co.'s No. 2 Jacobs, Sec. 28-11s-6e ..... Tested salt water 1,834 ft.; trying to sidetrack stuck drill stem.

ST. MARTIN PARISH

Harrison & Abercrombie's No. 1-A Barras, Sec. 66-11s-6e.. Drlg. sandy shale 6,312 ft.

ST. TAMMANY PARISH

Washington-St. Tammany's No. 2 Cossack, Sec. 5-6s-10e.. Shut down in gumbo 2,031 ft.

TANGIPAHOA PARISH

Joan Development Co.'s No. 1 Lake Superior, Sec. 20-5s-9e, 540 ft. E, 675 ft. N of SW cor ..... Total depth 3,035 ft.; shut down.

TERREBONNE PARISH

United Prod. Corp.'s No. 9 Minor, Houma ..... Drlg. sandy shale 5,515 ft.
The Texas Company's No. 4 State, Caillou Island ..... Driving piling.
The Texas Company's No. 6 State, Caillou Island ..... Setting up.
The Texas Company's No. 1 La.L.&E., Bay St. Elaine ... Hard sand and lime 4,751 ft.; drill stem stuck.
The Texas Company's No. 6 State, Bay St. Elaine ..... Location.
The Texas Company's No. 4 State, Dog Lake ..... Driving piling.
The Texas Company's No. 5 State, Four Isle ..... Rig.
The Texas Company's No. 3 La.L.&E., Bay Junop ..... Location.
The Texas Company's No. 4 La.L.&E., Bay Junop ..... Location.
The Texas Company's No. 6 State, Lake Barre ..... Driving piling.
The Texas Company's No. 8 State, Lake Barre ..... Drlg. hard sand rock 4,781 ft.
The Texas Company's No. 9 State, Lake Barre ..... Drlg. gumbo 3,200 ft.
The Texas Company's No. 5 State, Lake Pelto ..... Location.

VERMILLION PARISH

Pure Oil Co.'s No. 1 Southwest, Louisiana Land Co., Gueydan ..... Drlg. hard sticky shale and sand.

G. R. McMILLAN DIES

CHATHAM, Ontario, Mar. 7.—George Robert McMillan, who learned the drilling trade at Oil Springs and later became a well known driller in foreign fields, died recently at Wingham, Ontario, in his sixty-eighth year.

ANOTHER WELL BONUS

MOUNT VERNON, Tex., Mar. 9.—A bonus of $10,000 was offered by the Mount Vernon Chamber of Commerce for the first oil well in Franklin County which would produce 1,000 bbls. a day at the end of 60 days.

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REO MOTOR CAR COMPANY, LANSING, MICHIGAN

SPEED WAGONS REO AND TRUCKS

SOUTHWEST TEXAS FIELDS

(Continued from Page 48)

Bauer in Nueces County, north of Robstown, is tearing down the rig at 5,507 feet, having reached contract depth and got nothing. The test attracted attention by getting showings of gas and oil.

In the Agua Dulce Field no final verdict has been reached yet in the Houston Oil Co.'s No. 1-B Ollie Purl. At 5,200 feet it was in alternate layers of shale and sand and still drilling. The No. 1 Comstock of the same company opened up a new gas sand carrying gasoline at 4,913 feet, and is located more than 1½ miles to the north and east.

There is much talk among operators about deeper sands in all the coast counties from Refugio south because of the success in finding deeper producing sands in the Refugio Field. Success there is encouraging operators to spend money to find deeper production in the other pools.

Sun Oil Co.'s No. 1 Dowdy, southwest of production in the Darst Creek Field, topped the Austin chalk at 2,230 feet, which is not far from about right with the producers of the field, and it stands a good chance of extending the field.

The Luling Oil & Gas Co.'s No. 1 Fannie Nixon, east of the field, topped the chalk at 2,784 feet and should emerge from the chalk this week. Its location is such that it would get the chalk lower than in the field and is not expected to be an extension but to open something new.

LA.-ARK. FIELDS

(Continued from Page 46)

to drill No. 1 Williams, Section 21-7-12, and has moved the rig and abandoned the location. Buttram Oil Co.'s No. 1 Hale, NE NE, Section 1-7-13, one-half mile south of production, had 1,000 feet of oil in the hole at a total depth of 2,354 feet, but it would not flow and the company is setting liner. This test had the top of the chalk at 2,068 feet, the shallowest depth of any well in the field, but the depth of the chalk is of no significance in Zwolle.

Franks and Others Testing Show

Franks and others are testing a show of oil in their No. 1 Hays, Section 22-8-11, at 2,380 feet. Ab Jones' No. 1 Ferguson, Section 33-8-12, was deepened from 2,448 to 2,528 feet and tested a show of oil and is waiting orders. J. M. Tompkins' No. 1 Stoker, Section 10-7-11, tested dry at 2,520 feet and is arranging to deepen. In spite of the disappointments, the field received two new locations in addition to Loring's deep test. W. M. Coats is building derrick for No. 3 Sabine Lumber Co., SW cor. SW NW, Section 1-7-12, and Triangle Petroleum Co. has derrick pattern on the ground for its No. 2 Sabine Lumber Co., 330 feet north and east of SW cor., Section 36-8-12. Eight miles northwest of the field and about the same distance southwest of Pleasant Hill, Jean Longoria has begun operations on a wildcat test, No. 1 Belton, NW cor. SE NE, Section 31-9-13. In the Pleasant Hill district, the John Henry Oil & Gas Co. tested salt water with an estimated 10 bbls. of oil in its No. 2 Cook Land Co. at a total depth of 3,310 feet and is being deepened.

Only Arkansas Completion a Failure

In Arkansas the sole completion was a wildcat failure in Hot Springs County, it being Anisman and others' No. 1 Hinson in Section 19-4-16, which was abandoned at a depth of 1,604 feet. In Union County the Ohio Oil Co.'s No. 5 R. Pumphrey, Section 12-17-14, Champagnolle district, tested and had 1,500 feet of fluid, about 50 per cent oil, at a depth of 3,011 feet and is building standard rig to pump. C. H. Murphy and others' No. 1 Union Saw Mill, Section 18-18-13, southeast of Champagnolle, cored the Nacatoch sand from 2,198-2,202 feet and is arranging to make a drill stem test. John H. James, trustee's No. 1 Fordyce Lumber Co., Section 11-9-15, Dallas County, tested dry with no show with drill stem tester at 2,035-55 feet.

There was only one new location staked in the border counties of East Texas during the last week, Seigal Brothers & Kelinson's No. 1 T. J. Taylor, F. O'Niel Survey, 1½ miles southeast of the town of Leigh, Harrison County. None of the other wildcats in the area has reached an interesting depth yet, and several wells are shut down while titles are being cured.

Five miles west of the Jackson Field in Mississippi, the Mississippi Petroleum Corp. abandoned its No. 1 Solvent Investment Co., Section 14-5-1w, Hinds County, as a dry hole at a depth of 3,042 feet and was the only completion in the State. Pirtle & Flint's No. 1 Payne, Section 27-6-1e, is preparing to make a drill stem test at 2,540 feet in top of the chalk, above which, it is reported, some oil showing was had in the black shale. Dixie Petroleum Co.'s No. 1 Clark, Section 6-16-5, Warren County wildcat, set 8¼-inch casing at 2,186 feet, total depth 2,248 feet, and is preparing to set liner and test a show of oil reported at this depth.

MICHIGAN FIELDS

(Continued from Page 56)

tion 30-5s-6e, Milam Township, Monroe County, are the other two locations.

Although there have been no completions of any great importance in or near the Mount Pleasant Field for about three weeks, about 15 wells are drilling, 13 in the original proved field and two in the Leaton Pool. Three drilling wells in the Muskegon Field and scattered active wildcats make a total of about 25 in the State.

Deep Test Will be Plugged

Officials of the Muskegon Deep Well Syndicate today announced that the first real deep test in the proved Muskegon Field, originally known as No. 5 Heinz, NE NE, Section 8-10n-16w, will be plugged and abandoned at a total depth of 4,754 feet.

Since the Salina, the Guelph (or Niagara) the Utica shale and the Trenton formations have been penetrated and the well is now being abandoned after having been drilled into what is believed to be the white St. Peter sandstone with only the Ozarkian or Beekmantown and the Cambrian or Lake Superior formations, deepest known by Michigan state geologists, unexplored.

The Lima Oil Corp.'s No. 5 Louis P. Haight, a gas well, NE SW, Section 9-10n-16w, Muskegon Township, was completed this week after a shot with an open flow gauged at about 240,000 feet a day.

CANADIAN FIELDS

(Continued from Page 51)

at 4,740 feet with small shows of oil and gas reported.

On the Moose Dome, Moose Oils' No. 1, LSD 16, Section 29-22-6w5, is making considerable gas from both the Madison and Devonian lime.

Red Coulee Field

In the Red Coulee Field, Scottish United Petroleums' No. 1, LSD 1, Section 3-1-16w4, is officially reported on the pump and making 100 bbls. a day. Production is being delivered to Imperial Oil, Ltd. Southern Alberta Exploration Co.'s No. 2 has been located just east of Southern Alberta's No. 1 producer in LSD 8, Section 3-1-16w4, test to spud in this month.

Northwest of the Red Coulee producers, Dalco Oil & Gas Co.'s No. 2, LSD 7, Section 19-2-17w4, is reported preparing to resume. The well has been standing at approximately 2,200 feet. It is 10 miles north of the nearest Red Coulee producer and indications are it will test a structure intervening between the Red Coulee and Milk River structures. At 2,200 feet the test had a small gas show.

Reserve Dome

Mayland Southern's No. 1, LSD 13, Section 4-1-19w4, 45 miles east of Coutts on the Reserve Dome, is installing boilers and will probably spud in this month. Several gassers are reported on the Montana side, and Western Natural Gas Co. is just completing a test on its Poindexter lease.

R. W. Kelly of Winnipeg and R. C. Stavely of Calgary are preparing to drill structure tests on the Blood Indian Reserve near Lethbridge.

Inland Petroleum, Ltd., is planning to test acreage on the Mowmac structure south of Monarch and west of Lethbridge. According to Arthur Densmore, general manager, H. M. B. Inglis of the Eugene Coste organization will have charge of a core-drilling campaign to start this month; and as soon as the core drilling is completed, a commercial test will be located.

In the Taber area, Alberta Pacific Consolidated Oils, Ltd., of Calgary, has resumed work on the Cole English Syndicate's No. 1, LSD 3, Section 11-10-17w4. It is claimed a fair show of oil was encountered at 3,303 feet. Alberta Pacific Consolidated will complete the test under arrangements with the Cole-English Syndicate.

The Majestic coal mining interests, headed by C. B. Magrath, are reported planning to drill a commercial test south of Taber if the Alberta Pacific test gets production, and Buffalo Oils, Ltd., is reported negotiating for drilling on two blocks of acreage north of Grassy Lake. Hudson's Bay Oil & Gas Co. last year did considerable geological work in the Taber area.

Hudson's Bay Operations

In the Keho Lake area, southern Alberta, Hudson's Bay Oil & Gas Co.'s No. 1 Keho, LSD 2, Section 17-11-22w4, is drilling at 3,235 feet after considerable trouble with caving.

In the Castor district, Hudson's Bay's No. 1 Paintearth, LSD 5, Section 27-39-15w4, is resuming at 3,628 feet after changing from rotary to cable tools.

Ribstone Field

In the Ribstone Field, east central Alberta, Algonquin Petroleums' No. 1, LSD 1, Section 20-45-1w4, is reported again drilling at 2,160 feet. It is expected to get the limestone around 2,200 feet, with possibilities of an oil horizon before the lime is reached, another in the top of the lime and another in the first break at about 75 feet in the lime.

As a result of a contract recently concluded by Ribstone Oils, Ltd., with the Canadian Pacific Railway for the supplying of fuel oil for use on oil-burning locomotives in the Canadian Pacific Railway mountain division, considerable additional drilling may be done this year in the Ribstone area. The contract calls for 400 bbls. a day with first deliveries within 60 days. Ribstone Oils, Ltd., is installing equipment in the field to handle and treat the production. In addition to railroad use, the crude has been tested by the Saskatchewan government for road oil purposes and with minor treatment has been found satisfactory.

Scattered Tests

In the Manitou district, southwestern Manitoba, Commonwealth Petroleums' No. 1 is reported drilling out cement at around 900 feet.

In the Kelowna district, British Columbia, E. G. McKenzie Syndicate's No. 1 Canyon Creek, S2E26 Osoyoos, is continuing drilling below 1,000 feet.

In the Pilot Butte district, Saskatchewan, Aladdin Oil & Gas Co.'s No. 1, Township 17-18w2, is reported drilling. Simpson Oil Co.'s No. 1, Section 9-29-25w2, near Simpson, is reaming at 2,730 feet preparatory to deepening.

Announcement has been made that Calmont Oils, Ltd., which has extensive holdings in the Turner Valley Field, will do no further drilling in the immediate future, but will take production from Calmont's Nos. 2 and 7 in LSD 11, Section 20-19-2w5.

Ontario Operations

A potential new field in Ontario will likely be tested this year as a result of the activities of a Detroit syndicate headed by A. G. Waters, which is leasing acreage in the northwestern part of Kent County, and the southwestern part of Lambton County, centering in the town of Wallaceburg and the Walpole Island Indian Reserve.

The Crude Oil Producers Association of Ontario asks the federal government to restore the bounty of 1½ cents a gallon formerly paid on Ontario production but discontinued in 1925. The matter will be considered at the approaching session of parliament which opens March 12.

CALIFORNIA FIELDS

(Continued from Page 56)

carrying 240 feet of perforated. The West Coast Petroleum Co.'s No. 3 Combination, another new well put on production this week, was good for 255 bbls. of unusually clean 23.2 gravity oil per day from 4,504 feet.

The Union Oil Co. has been experiencing tough drilling in its No. 1 Vidor, an outpost in the eastern part of the field, with the result that footage for the week was below par. Progress in this well was delayed by an extremely hard shell which defied efforts to make hole. For several days only 1 or 2 feet of hole was possible. The most interesting feature in this connection is that this shell was not encountered in any of the many wells drilled in the productive section of the field.

Ventura Avenue

The Associated chalked up an exceptionally good well in the Ventura Avenue Field this week when No. 95 Lloyd was brought in flowing 3,589 bbls. of clean 29.2 gravity oil and 3,300,000 feet of natural gas per day from 7,374 feet, the hole having been finished with a 6⅝-inch oil string. Both the Associated and Shell have several other potential producers nearing completion and they should be tanking oil within the next few weeks.

The Honolulu Consolidated spudded in its first well on tideland permit No. 56 in the Rincon Field of Ventura County and the bit was already down 1,030 feet at the close of the week. On Needham permit No. 55, the General Petroleum is rotating ahead in a gray oil sand at 2,450 feet.

In the Elwood Field, the Barnsdall and Rio Grande are making preparations to test out the Sespe in No. 14 Bell Luton at 3,800 feet. No. 1 Bishop-Evans, another Sespe test at Elwood, has taken on a doubtful aspect at 4,470 feet. Three new locations have been made in the Santa Barbara Mesa Field and rig construction on at least one of these new wells is expected to be started shortly. These locations were mapped by H. H. Barnes, Palisades Petroleum and Santabar Oil Co.

The coming week should prove an interesting period to those watching developments in the Lost Hills-Belridge Fields of Kern County as two wells are scheduled to be given production tests. The most important of these is the test being drilled by George F. Getty and the Lincoln Drilling Co. at Lost Hills in Section 12-26-20. The production test on this well may, however, be delayed depending on the water shutoff and the amount of oil sand present. The Universal Consolidated may also make a test soon as its No. 49 is showing some oil at 5,280 feet.

In the Belridge Field, the Union's test in Section 36-29-21 has been in oil sand for the past 10 days and tentative plans have been made for an early test. The Richfield has abandoned the lower 3,000 feet in its No. 1 Belridge in Section 22-27-20 and since operations have been suspended the entire hole may be abandoned. The Texas Company is still drilling ahead in its offset to this well and the outcome will naturally be watched with considerable interest, especially because it will prove up the intervening territory if commercial production is secured.

Long Beach

Only one of the wells put on production in the Long Beach Field of Los Angeles Basin this week registered substantial production. This was E. J. Preston's No. 32 Cerritos, which came in under a natural flow doing 1,075 bbls. of 27.4 gravity oil per day from 5,242 feet. The substantial production shown by this well, which was finished with a 4¾-inch liner carrying 410 feet of perforated, proved a surprise as other operators passed up this 400-foot zone when deepening their wells from the 3,500-foot level to 5,800 feet because it did not look promising enough. If Preston's new well holds up it will undoubtedly lead to a revival of interest in the area located at Pacific Avenue and Wardlow Road.

The Shell added a new well to its list of producers by completing No. 4 Ham-

ilton, but it was only good for 260 bbls. of clean 24.6 gravity oil per day on the beam from 4,241 feet. The Richfield Oil Co. also finished a well this week when it recompleted No. 2 Haas doing 350 bbls. per day from 3,729 feet. The Dabney Johnston Oil Co. put No. 79 Signal on a production test at 7,005 feet and, while this project came in doing 300 bbls. per day, the output is still cutting in excess of pipe line requirements. Drilling operations in the Long Beach Field are getting smaller with each succeeding week, resulting in a substantial decline in new completions.

In the Inglewood Field of Los Angeles Basin the Standard's well No. 65 on Los Angeles Investment least No. 1 is holding up in good shape, present production approximating 390 bbls. per day from 2,700 feet. The next completion in this field will be the Standard's well No. 26 on Vickers lease No. 1. The Wilshire Annex Oil Co. has material on ground for its new well to be located on the Potrero Country Club property, recently quitclaimed by the Associated as unproductive commercially.

GULF COAST FIELDS

(Continued from Page 50)

1,401-3,245 feet to reach the sand showing oil. Humphreys' No. 2 Scott, 1,500 feet to the east, which made a small amount of oil and was abandoned after deepening to 7,697 feet; Mills Bennett Production Co.'s No. 3 E. W. Barber, a wildcat producer, 3,000 feet to the west; Humphreys' No. 1-B Barber, 800 feet west, abandoned at 4,267 feet; the Morgan well, and Humphreys' No. 2-B Barbers and Mills Bennett's No. 1-B Barber, the latter two now drilling, and the Fitzgerald test comprise the only deep drilling which has been done on the strictly north flank of the dome.

Production Test to Be Made

At Refugio, interest is being centered on a production test to be made in the field during the week March 10-17 under the supervision of Joe B. Moncrief, at present umpire of the Pettus Field. During the test all flowing wells will be placed on a quarter inch choke and a check of the production on three days, March 13, 17 and 20 will be made to determine the effect on gas-oil ratio. It has been estimated that 200,000,000 feet of gas is being wasted daily in the field through high gas-oil ratios. The check is being made following the outcome of a meeting of Refugio operators in San Antonio the past week.

Mills Bennett Production Co.'s No. 2 Reese at Allen is bearing a little watching at this time. This test, a deep wildcat on the northwest flank of the dome, went into salt at 4,809 feet late in the week and at latest report was drilling ahead at 4,834 feet. It was located on the dome with a view toward drilling through salt and proving the existence of an overhang there. It drilled through an overhang of cap rock at 1,200-2,685 feet, similar to one found in this company's No. 1 Poole, on the southeast side of the dome, and has been in formation until the encountering of salt at its present depth. The Poole well after going through cap drilled to 4,374 feet where it was completed as a producing well. Production at Allen has been confined to the southeast side of the dome but very little drilling has been done elsewhere and no deep tests have been drilled on the west and north where the Reese wildcat is located.

The only other completions of the week were two workovers, one at Sulphur and the other at Humble. At the former field, Union Sulphur Co.'s No. 747 fee, which drilled to salt at 4,479-5,316 feet and sidetracked to sand at 4,108-19 feet, set 11 feet of 4½-inch screen and flowed at the rate of 188 bbls. daily for a short time. It is being put on the pump. Rio Bravo Oil Co.'s No. 6 fee, Humble, is pumping 21 bbls. net oil with lots of water from sand at 4,373 feet. It formerly was completed at 4,409 feet.

OKLAHOMA FIELDS

(Continued from Page 41)

wildcat tests in the county were shut down. Obermeyer and others' No. 1 Skelton, NE cor. SW SW Section 32-1s-7w, is shut down at 1,375 feet. R. Southard and others' No. 1 McKinney, NE cor. Section 25-1-8w, is shut down at 1,063 feet. Junior Oil Co.'s No. 1 Thompson, NE cor. SW SE Section 1-1-7w, is shut down at 3,325 feet.

Marshall County, which was in the limelight with new activity during the last summer, is quiet. In the Madill district, Magnolia Petroleum Co.'s No. 3 Coatesworth, NW cor. SE SE SE Section 30-5s-6, was drilling at 567 feet, expecting the pay horizon in a few feet. Industrial Oil & Gas Co.'s No. 1 Sharp, NE cor. Section 15-6s-5, was a new location. The test is expected to be drilled to a total depth of 1,000 feet if necessary.

In Western Area

Prairie Oil & Gas Co.'s No. 1 Upperman, SW cor. NW, Section 22-22-1, deep test in Noble County, in the Otoe Indian district, was drilling on iron at 4,665 feet, in Simpson sand. The top of the Simpson sand was found at 4,656 feet. Water was found in the Simpson at 4,662 feet. Same company's No. 1 Green, SE cor. NE NW, Section 22-22-1, was drilling at 4,300 feet.

In the Magnolia Pool, west of Perry in Noble County, Magnolia Petroleum Co.'s No. 1 Roberts, NE cor. SE, Section 21-21-2w, was drilling at 5,500 feet. Same company's No. 3 Young, SW cor. NW, Section 21-21-2w, was attempting to straighten the hole at a total depth of 3,000 feet. The test was plugged back and cemented and drilled to 600 feet and may be plugged back again.

Sinclair Oil & Gas Co.'s No. 2 Waltermire, NE cor. SW SE, Section 33-21-1w, was spudded and shut down. A new location was announced by the Gar-Wood Oil & Gas Co. for No. 2 Read, C SE SE, Section 20-24-1, in the northern part of Noble County.

An Important Test

Kay County in the northern part of the State is one of the active counties. Many express the opinion if the Wilright Oil & Gas Co. and Haynes Drilling Co.'s No. 1 Wildegrube, NE cor. SW, Section 14-27-1, 6 miles north and east of Blackwell, in Kay County, produces from the Wilcox sand, a new area will be developed between the old Blackwell Field in the eastern part of the county and the Tonkawa Field in the southern part of the county. Production in the test is expected at approximately 4,150 feet in the Wilcox sand. It is believed petroleum deposits exist in the area east of the Chikaskia River. The test had 60 feet of Stalnaker sand which was dry, but a good showing of oil was found in the Bartlesville sand at 3,587 feet, and if no deep sand production is found it may be plugged back to the Bartlesville sand.

The wildcat test of the Boucher Oil Co. is expecting to reach the pay horizon at 3,800 feet. The test is No. 1 Jefferson, NE cor. SW, Section 32-26-1w, and was drilling at 3,600 feet on the last report.

Greater Seminole Production

The production from the Greater Seminole area for the week ending March 2 averaged 174,655 bbls. a day from 2,865 wells. The first 12 pools listed below comprise the Seminole area which averaged 111,006 bbls. of oil a day from 1,872 wells.

Pool—	Wells	Bbls.
Little River	369	18,522
East Little River	82	9,543
Carr City	80	11,629
Maud	133	3,114
Mission	93	3,551
Bowlegs	278	10,743
Earlsboro	283	15,912
South Earlsboro	27	6,436
East Earlsboro	158	14,207
Seminole	254	12,362
East Seminole	33	1,122
Searight	82	4,865
Total	1,872	111,006
Allen	278	12,170
Asher	26	702
Wanette	56	7,583
Konawa	111	19,307
Sasakwa	50	3,607
St. Louis	472	20,280
Grand total	2,865	174,655

Greater Seminole Shipments

The pipe line shipments from the Greater Seminole area totaled 160,705 bbls. a day for the week ending March 2. The daily average shipments by companies were as follows:

Company—	Seminole (bbls.)	Pearson, Asher, St. Louis (bbls.)	Konawa (bbls.)
Barnsdall	1,650	....	....
Champlin	2,998	....	735
Consolidated	....	1,990	....
Cosden	6,046	....	3,008
Deep Rock	2,112	2,095	....
Empire	6,351	....	....
Gulf	10,260	1,986	1,435
Magnolia	6,114	5,528	2,862
Oklahoma	19,492	611	148
Phillips	938	....	....
Prairie	3,895	4,693	695
Prod. & Ref.	2,039	....	....
Pure	7,871	....	....
Shell	1,701	256	1,281
Stanolind	21,217	6,419	3,715
Texas	7,707	1,777	1,956
Tidal	8,479	3,334	....
White Oak	1,156	....	....
Total	111,023	28,688	15,885
Tank cars	5,251	858	
Grand total	115,274	29,546	

Oklahoma City Shipments

The total shipments from the Oklahoma City Field for the week ending March 2, were 551,147 bbls. of oil from the leases. The pipe line shipments from storage were 23,648 bbls. a day. Tank car shipments from the area were 36,396 bbls., the oil being shipped in 179 tank cars. The shipments by companies were as follows:

Company—	Bbls.
Anderson-Prichard	30
Crude Oil	1,560
Empire	19,317
I. T. I. O.	7,649
Magnolia	3,942
Oklahoma	12,293
Operators	2,352
Peacock & Peveto	1,806
Prairie	593
Shell	513
Sinclair (to storage)	2,496
Sinclair-Texas	2,636
Slick	9,253
Stanolind	11,165
Tidal	1,997
Wilcox	1,119
Total	78,721

Oil purchased from storage was as follows

Purchaser and seller	Bbls.
Sinclair-Texas, Sinclair	4,509
Oklahoma, I. T. I. O.	3,621
Shell, I. T. I. O.	2,730
Stanolind, I. T. I. O.	3,439
Magnolia, Slick	516
Stanolind, Slick	6,126
Tidal, Operators	1,885
Empire, Operators	822
Total	23,648

Oklahoma City Production

The following wells were on production during the seven days ending March 2, in the Oklahoma City Field, under proration. All other wells were shut in and will be produced according to the curtailment plan.

	S-T-R	Wells	Prod.
Anderson-Prichard:			
Gibbons	1-11-3	4	18
Graham	2-11-3	1	85
Key	2-11-3	1	146
Moore	2-11-3	1	97
Orphanage	2-11-3	1	34
Pest House	2-11-3	2	1,243
Brown et al	14-11-3	1	249
Blackwell:			
Garr-Page	35-12-3	1	418
Patterson	10-11-3	1	775
Schilling	10-11-3	1	1,069
British-American:			
Eckroat	10-11-3	1	1,371
Holmes	10-11-3	7	1,709
California:			
Stout	2-11-3	1	1,286
Chattam:			
Lindsey	2-11-3	1	915
Coline:			
Clour	23-11-3	16	75
Olds	24-11-3	10	631
Warren	18-11-2	8	256
Continental:			
Sudik	6-10-2	4	434
Vinita Park	2-11-3	2	377
Cromwell-Franklin:			
T. Park	13-11-3	32	2,672
Denver:			
Alexander	2-11-3	1	1,119
Don Leon:			
Hunsicker	2-11-3	1	2,617
Heeman-Coe:			
Cunningham	1-11-3	2	389
I. T. I. O.:			
Banta	18-11-2	1	9
Barker, Drake	14-11-3	1	142
Brokaw, C.	13-11-3	4	7
Butterfield	11-11-3	1	208
Canfield	19-11-2	2	5
Canfield, Butt	19-11-2	3	38
Carrico	14-11-3	5	195
Coppinger	11-11-3	8	218
Corff	11-11-8	5	290
Eacock	11-11-3	2	31
Emmerson, N.	30-11-2	11	109
Farley, E.	24-11-3	1	118
Farley, L.	19-11-2	4	248
Farley, Fussell	19-11-2	2	388
Ferndale, Comm.	11-11-3	5	200
Foster	24-11-3	1	6
Habegger	14-11-3	2	129
Hiddleston, S.	19-11-2	1	319
Huffman	14-11-3	2	90
Ivanhoe	15-11-3	2	70
Johnson	25-11-3	9	255
Jones, H. W.	1-11-3	4	564
Jones	31-11-2	14	1,342
Knox, May	14-11-3	4	5
Lawrence Place	15-11-3	3	7
Lemmon	11-11-3	5	90
Lindsey	15-11-3	1	64
M. K. & T.	35-12-3	4	110
Okla. S. Land	36-11-3	8	620
Pasadena Heights	14-11-3	5	290
Peterson, Sad	25-11-3	8	344
Precure, A.	11-11-3	1	62
Precure, E.	11-11-3	2	136
Rensimer	14-11-3	1	11
Reynolds	6-10-2	1	5
Speegle et al	24-11-3	3	191
Spillman	14-11-3	3	150
Starkey	11-11-3	2	146
Sudik	31-11-2	10	425
Terrace Lawn	10-11-3	1	911
Thelmer, E.	12-11-3	8	591
Trosper	13-11-3	11	579
Trosper, Clar	14-11-3	4	135
Trosper, H. G.	14-11-3	7	98
Trosper, L.	12-11-3	2	40
Trosper, P.	18-11-2	1	83
Unsell, M.	23-11-3	6	164
Unsell-Krager	23-11-3	3	185
Viewpoint	10-11-3	4	2,669
Warner, Farley	23-11-3	3	141
Wheeler	13-11-3	3	37
Wilkie-Snyder	25-11-3	3	4
Williams	23-11-3	1	123
Johnson-Dabney:			
Foote	10-11-3	1	701
Julian:			
Houser	14-11-3	1	360
Shepard	14-11-3	1	359
Walker	10-11-3	1	72
Kedberg:			
Burss	2-11-3	1	31
McArthur:			
Armour	2-11-3	1	247
Mid-Kansas:			
Fortson	24-11-3	5	6
Mollman	23-11-3	4	321
Trosper, D. B.	19-12-1	1	165
Mid-Texas:			
August	3-11-3	1	299
Community	1-11-3	1	2,652
Minnehoma:			
Pugh	2-11-3	1	1,047
Oils Inc.:			
Hathaway	2-11-3	1	78
Patton-Wilcox:			
Short	10-11-3	1	311
Phillips:			
Ball	3-11-3	1	340
Carey	2-11-3	1	24
Ciger	2-11-3	1	830
Day	2-11-3	1	2,619
Jones	1-11-3	1	109
King	10-11-3	1	1,231
Kleinegger	10-11-3	1	279
Lybrand	2-11-3	1	1,293
Rallen	2-11-3	1	779
Roden	2-11-3	1	1,221
Roose	2-11-3	1	215
Velt	2-11-3	1	117
Prairie-Slick:			
Hiddleston	19-11-2	7	96
Sigman	32-11-2	7	456
Scott:			
Ashley	14-11-3	1	2,341
Shaffer, J. C.:			
Childs	14-11-3	1	56
Shell:			
Potty	30-11-2	7	180
Sinclair:			
S. Land No. 54	36-11-3	16	645
S. Land No. 67	36-11-3	5	18
Stamper	30-11-2	6	36
Venci	31-11-2	16	635
Skelly:			
Dunn	1-11-3	1	1,062
Harper-Turner	3-11-3	1	841
Hoops	31-11-2	8	582
Skelly et al:			
Hurt	2-11-3	1	1,829
Slick, T. B.:			
Campbell	3-11-3	3	2,074
Central	3-11-3	1	26
Classen	2-11-3	4	3,037
Classen-Edwards	3-11-3	1	1,018
Dean	10-11-3	1	2,103
Foote	2-11-3	3	485
Foote-Briscoe	2-11-3	1	45
Glidden	13-11-3	3	49
Laro	2-11-3	1	927
Thornton	15-11-3	1	669
Wespaco	34-12-3	1	506
Whitfield	34-11-3	1	1,099
Wilson	2-11-3	1	1,196
Slick, T. B., et al:			
Baker	1-11-3	5	94
Clegg	2-11-3	3	750
Rodman	2-11-3	1	64
Trumbley	2-11-3	1	273
Slick, T. B.-I.T.I.O.:			
Huddleston	14-11-3	1	74
Sun Ray:			
Harris	2-11-3	1	219
Mead	34-12-3	1	236
Olafson	2-11-3	1	112
Twyford-Smith	10-11-3	1	486
Wirt Franklin:			
Lowery	12-11-3	10	1,391
Page	35-12-3	5	939
Shehan	2-11-3	2	28
Theimer	2-11-3	13	263
Total	731		74,486
Last week	727		100,170

New wells 4. Decrease 25,684 bbls. Average per well for pool 102 bbls.

Carter County

The Texas Company is building the rig for No. 6 Eaves, NE cor. SW SW, Section 24-1s-3w. Magnolia Petroleum Co. is erecting the rig for No. 1 Burton, NW cor. SE NW, Section 30-1s-2w. C. L.

Anderson's No. 8 Eaves, SE cor. NW SW, Section 24-1s-3w, has been completed for 470 bbls. in sands 2,381-2,854 feet. Magnolia Petroleum Co.'s No. 4 Dickerson, SE cor. NE, Section 24-1s-3w, Tatums Pool, made 826 bbls. from sand 1,925-83 feet.

Creek County

Gled Oil Co. moved the rig in for No. 2 Travis, C SE NE, Section 13-19-8. C. O. Buckles and others' No. 1 Bruner, NE cor. SW SW, Section 3-19-9, is a machine rigging up. Johnson Oil Refining Co.'s No. 1 Cordell, SW cor. SE SW, Section 17-19-9, is a machine rigging up. Westfall Drilling Co.'s No. 1 Chatham, NW cor. NE SW, Section 32-19-9, is rigging up. J. E. Wallace and others' No. 1-A Baker, SE cor. NE NW, Section 14-17-10, an old well, is drilling deeper at 2,600 feet. Phillips Petroleum Co. made location for No. 5 Charles, SW cor. SE SE, Section 25-15-7. Atlantic Oil Producing Co. and others' No. 1 Fuel, SW cor. NW, Section 26-14-10, is a rig on the ground. J. B. Grieves' No. 9 Lowe, SW cor. NE NE, Section 13-19-8, has been completed for 210 bbls. in sand 2,115-50 feet. F. Wood Oil Co.'s No. 1 Langley, NE cor. SE, Section 19-19-9, has been abandoned at 2,596 feet. C. O. Buckles and others' No. 1 Replogle, NW cor. NE SW, Section 10-17-8, has been abandoned at 3,475 feet. Wilcox & Whitten's No. 1-A J. Baker, CEL NW NW, Section 14-17-10, is a dry hole at 2,095 feet. F. R. Billingslee's No. 2-A Wayman, NW cor. NE NW, Section 22-15-8, made 185 bbls. in sand 2,870-2,920 feet. C. G. Tibbens Oil & Gas Co.'s No. 1 A. Wilson, NW cor. NE SW, Section 18-14-9, has been completed for 140 bbls. in sand 2,346-86 feet. Thompson Penrod's No. 1-A Perryman, NW cor. SE, Section 1-14-11, is dry and abandoned at 2,940 feet.

Hughes County

Boettcher Oil & Gas Co. made location for No. 1 Schramm, C SE NW, Section 11-7-8. McGee Brothers' No. 1 Deer, SE cor. SW SW, Section 1-9-10, has been shut in for 5,500,000 feet of gas in sand 1,193-94 feet.

Jefferson County

W. H. Smith has the rig up for No. 1 McClarty, SE cor. NW NE, Section 18-4s-8w.

LeFlore County

Sooner Oil & Gas Co.'s No. 1 Unknown, SW cor. NW NE, Section 28-7-26, has been completed for 1,400,000 feet of gas in sand 1,732-1,829 feet.

Marshall County

Otto Reynolds' No. 1 Rice, SW cor. SE SE NE, Section 36-5s-5, Madill Pool, is drilling at 100 feet.

Muskogee County

J. H. McDonald and others moved a machine in for No. 4 Durant, CNL NE NE, Section 16-14-18. Braman Oil Co.'s No. 2 J. Jackson, SW cor. NW, Section 17-13-16, is rigging up. Taylor & Geiger's No. 5 D. Tucker, NE cor. NW, Section 16-15-15, has been completed for 178,000 feet of gas in sand 770-865 feet.

Okfuskee County

Shelden & Staples' No. 2 Jacobs, SW cor. SE NE, Section 21-12-11, has been completed for 40 bbls. in sand 3,452-85 feet after plugging back from 3,494 feet.

Okmulgee County

McDonald and others' No. 1 E. Tiger, SW cor. NW, Section 19-16-14, has been abandoned at 1,710 feet. Laswell and others' No. 3 S. Johnson, NW cor. SE SE, Section 27-13-13, has been abandoned at 1,900 feet.

Oklahoma County

Watchorn Oil & Gas Co. has the rig up for No. 1 Traders Compress, NW cor. SE SE, Section 34-12-3w, Oklahoma City Pool. Westgate Oil Co. is building the rig for No. 2 Carey, NE cor. SE NW SE, Section 34-12-3w. Dengail, Carolyn and others made location for No. 1 Ransom, Block D, Wisner Addition, NE cor. SE SW NW, Section 10-11-3w. H. E. Wilcox Oil & Gas Co. and Marshall's No. 1, Block 7, Chapin-Levi Addition, SE cor. NW NW, Section 10-11-3w, is rigging up. L. G. Simon and S. P. McGinnis' No. 1 McGinnis, Block 6, Lot 6, Chapin-Levi Addition, NE cor. SE NW NW, Section 10-11-3w, is drilling at 1,800 feet. Blackwell Oil & Gas Co. and Jones Drilling Co.'s No. 1 Garr-Page, NW cor. SE NW SE, Section 35-12-3w, made 2,924 bbls. in eight hours from Johnson sand 6,410-52 feet. Johnson & Dabney's No. 1 Foote, CEL NW SE NE, Section 10-11-3w, has been completed for 8,490 bbls. in eight hours from Wilcox sand topped at 6,287 feet, base 6,360 feet, total depth 6,395 feet. H. H. Patton and H. F. Wilcox Oil & Gas Co.'s No. 1 Short, CSL NW NW SW, Section 10-11-3w, topped Wilcox sand at 6,460 feet, drilled to 6,550 feet and made 2,175 bbls. in four hours. Indian Territory Illuminating Oil Co. and others' No. 7 Hugh Trosper, SW cor. SE NE, Section 14-11-3w, made 418 bbls. in 11½ hours producing from sand 6,200-6,443 feet, total depth 6,456 feet.

Osage County

Producers & Refiners Corp. made location for No. 1, NW cor. SE SW, Section 15-24-7.

Pontotoc County

C. E. Davis and others moved a machine in for No. 1 A. Dyer, SW cor. NW SE, Section 8-4-7.

Pittsburg County

Central States Power & Light Co. has the rig on the ground for No. 1 Cother, SW cor., Section 9-7-18. R. Vincent and others' No. 1 Unknown, NW cor. SE, Section 9-5-14, is drilling at 100 feet.

Pottawatomie County

Droppleman Drilling Co. has the rig on the ground for No. 1 Jones, SE cor. NW, Section 21-8-3. J. A. Hull is erecting the rig for No. 2 Townsend, NW cor. SE SE, Section 22-6-3, West Asher Pool. Payne and others' No. 5 Bullock, SE cor. SW NE, Section 22-6-3, has been completed for 1,709 bbls. in sand 3,577-3,623 feet.

Seminole County

Mid-Continent Petroleum Corp.'s No. 1 Tommy, SE cor. NE NE, Section 25-8-7, is rigging up rotary tools. Amerada Petroleum Corp.'s No. 4 Tiger, NW cor. SE SW, Section 3-8-5, Carr City Pool, is dry and abandoned at 4,157 feet. J. E. Crosbie, Inc.'s No. 1 Robinson, NW cor. SE NE, Section 30-8-8, Wewoka Townsite Pool, has been abandoned at 4,240 feet.

Stephens County

George Pace has the rig up for No. 10 McMasters, NW cor. SW NE NE, Section 13-2s-8w.

Wagoner County

Bailey and others' No. 6 Replogle, SE cor. NW NE, Section 31-19-16, is drilling at 380 feet.

SOME FACTORS IN THE MANUFACTURE OF GREASE

(Continued from Page 38)

questioned that an extremely heavy-bodied oil possesses a stronger lubricating film than an extremely light-bodied oil. The mineral oil should be selected in accordance with the pressure and rubbing speed of the parts to be lubricated and the maximum temperature to be encountered.

Commercial fats of a known origin, generally, are sufficiently uniform to insure satisfactory results; however, in order to insure absolute uniformity, close chemical control is necessary, as changes in color, odor, melting point, acidity, or per cent unsaponifiable matter will cause variations in quality in the finished product. A very satisfactory and inexpensive investigation procedure upon which to base purchase specifications is to manufacture small batches on an experimental scale and inspect the results. Proper specifications including saponification number, acidity, melting point and color should suffice to maintain quality of shipments received. A number of saponifiable oils require special, individual tests to establish their identity. These oils contain infrequently occurring members of known chemical classification, which are responsible for certain individual behavior of the soap products. Included in the group are fish oil, rosin oil, castor, rapeseed, cocoanut and linseed oils. Control should be exercised in the purchase of lime, as variations in the strength of the lime employed would cause variation in the consistency of the resulting lime soap greases. Specifications require the absence of silica, as a high silica content will cause excessive wear in close bearings. The importance of the quality of lime has been recognized by a number of lime manufacturers in their offering to the trade special grades suitable for grease making and having the highest quality.

Manufacturing Equipment

Kettles are, of course, the principal items of equipment in a grease plant and may be divided into three classes: Open type steam jacketed kettles, closed type steam jacketed pressure cookers, and direct fire heated kettles. Each of these types has its own characteristics and no one of them will serve entirely satisfactorily for the manufacture of every kind of grease. The open type steam jacketed kettle is the most widely used type and is applicable to the manufacture of all varieties of grease with the exception of those requiring high temperatures in their preparation. The advantages of this type are: Its easy accessibility for charging and cleaning, even distribution of heat and close regulation of temperature, economical operation and freedom from hazards. The principal disadvantages are the slowness with which saponification takes place, liability of incomplete saponification, and limitation of temperatures. This latter factor prevents complete dehydration of some special soaps.

The pressure type steam jacketed kettle is used in preparing the soap stock that is transferred to an open kettle where the mineral oil is added and the grease is finished. Its advantages lie in the speed with which the soap stock can be prepared, more nearly complete saponification, close control on water content and the uniformity that can be maintained. Due to using steam as a heating medium, the high temperatures necessary for complete dehydration are not reached. At the Ponca City plant of the Empire Oil & Refining Co. a pressure kettle has been installed in a central location in order to supply two large open steam jacketed kettles. A batch of soap is made in the pressure kettle and run to the one open kettle where oil is added and the grease finished. While this operation is being carried out a new batch of soap is made in the pressure kettle for the second open kettle. An almost continuous production of grease is, therefore, carried on through this manipulation and due to the fact that a batch of soap can be made in the pressure mixer in 45 minutes, as compared with two to four hours in the open kettles, the plant capacity is more than doubled.

Fire heated kettles are used for the manufacture of greases that require a temperature above which steam jacketed kettles can supply. The disadvantages of their use are operating hazards and the difficult control.

A considerable saving in material cost and in handling costs is effected by purchasing the fat in tank car lots rather than in barrels. The tanks are equipped with steam coils so that the fat may be melted and pumped to a small tank located directly over the kettles and which is used to measure, accurately, the quantity of material for a batch. Aluminum metal tanks have been found quite satisfactory for the storage of fatty acid, as no discoloration will be caused even when held for relatively long periods at somewhat elevated temperatures. The mineral oil storage tanks are so arranged that the amount of oil can be measured accurately, and run by gravity into the grease kettles.

Types of Soap-Oil Mixtures

A classification of the various soap-oil mixtures, with reference to the saponifying agent or metallic base, affords a very advantageous procedure for discussion. The greases will be discussed in the following order: Calcium, sodium, aluminum and lead soap greases. Zinc and potassium soap greases are not included since they have no special advantages and are rarely employed in the manufacture of lubricants.

Calcium Soap Products

Calcium or lime soap greases are in demand probably more than any other soap thickened lubricant. The commonly known varieties include the several grades of cup grease, pressure gun grease, ball and roller bearing grease, axle grease and water pump grease. The greases, ranging from semifluid to semisolid consistency contain from 4 to 25 per cent soap. The mineral oil ingredient is usually a highly refined light or medium bodied grade.

Calcium base greases may be made in two ways and are classified, according to the method used as cold sett greases and hot mixed greases.

The cold sett greases are made by simple mixing of rosin oil, lime and mineral oil. Saponification takes place and the mixture hardens without application of heat from an outside source. Rapid saponification cold is peculiar to the fatty members predominating in rosin oils. These greases are specialty products but are used extensively enough so that something more than passing notice is deserved.

The most convenient manufacturing procedure is to prepare two mixtures—a rosin compound and a sett compound. The rosin compound consists of rosin oil and a quantity of mineral oil. The sett compound consists of the lime and mineral oil. When the two compounds are brought together and thoroughly mixed, saponification takes place and after a 30 to 60-second interval, the mixture hardens. The ingredients of the compounds are so proportioned that equal parts of the two give the desired consistency. Normal room temperature is sufficient to insure satisfactory results.

Sett greases are comparatively inexpensive, and are designed for rugged duty, where the cost of higher quality lubricants is prohibitive. The greases invariably contain an excess of the saponifying agent, which, in the form of hydrated lime, is insoluble in the grease body. The excess, obviously, constitutes an abrasive element. The greases are therefore unsuitable for lubricating accurately machined parts, functioning under ordinary load conditions, since abrasion would disrupt the lubricating film.

Hot mixed calcium soap greases are made by saponifying the fatty ingredient with an accurately measured amount of hydrated lime. The chemical reaction is carried to completion in either open type steam heated kettles or closed type pressure cookers. The extended period of contact at elevated temperature enables the reaction to be carried nearly to completion.

Lime Base Greases

Lime base greases are made either in open steam jacketed kettles by the wet or dry method, in closed steam jacketed kettles, or in a combination of the two. In the dry method of making lime base grease in open top steam jacketed kettles, the fat, the amount of lime necessary for saponification of the fat, a small amount of nonviscous oil, and an excess of water are cooked with agitation until the fat is saponified. Agitation must be vigorous and should be more of a kneading action than a mere stirring. Heating is continued until all of the excess moisture is evaporated and then agitation is carried on with the heat turned off until the soap is slightly cooled. Mineral oil and water are added until the right consistency is reached and the necessary amount of water required for the emulsion is present. In the wet method, less water is added and the soap is cooked down to about the right water content and the oil added. This method is quicker, but more inconsistent results are obtained as there is some guess work attached to determining when the water has been reduced to the right point.

The pressure mixer overcomes the disadvantages of the foregoing methods in time saving and in securing complete saponification and uniformity. The pressure kettle is charged with definite amounts of fat, lime, water, and a small amount of nonviscous oil to soften the soap. Steam is turned into the jacket and, under the influence of heat, pressure is built up inside the kettle amounting to 65 to 85 pounds depending on the steam quality. Saponification is complete in 20 to 25 minutes and the soap is blown to an open mixer by its own pressure where oil and water are added to complete the batch. The water in the mixer is lost by flashing off when the mixer is blown out

and a dry base is delivered to the open kettle to which definite amounts of water may be added. It is possible to complete the batch in a pressure kettle, however, this is not an economical practice and is seldom employed.

A well made cup, pressure gun or roller bearing grease, should contain practically no abrasive solid, such as excess of lime. Many manufacturers employ the practice of using a slightly insufficient amount of lime and completing the reaction with a nonabrasive agent; a practice which is quite workable with the pressure type cooker. As a further precaution against lime lumps and foreign material the grease should be pumped through a strainer in the drawing process.

Calcium soap greases are not applicable as lubricants where the temperature is apt to rise above 212° F. The grease is not a true solution of soap and oil, but is a suspension of soap and water in oil and is dependent upon the water content to maintain the grease body. Consequently at a temperature in excess of 212° F., the grease loses its moisture and a separation of soap and oil results. Excessive pressure also causes separation of soap and oil.

The stability at high temperature and pressure is greatly improved by proper selection of the fatty ingredients. Incorporation of high viscosity mineral oil is also beneficial in this respect.

The outstanding characteristics of calcium soap greases are: Their insolubility in water, and short sheat or buttery texture. The texture indicates a low degree of cohesion within the grease body, which, in accordance with the lubrication theory outlined above, is the more suitable for high speed bearing lubrication. The texture also offers high resistance to flow and it is therefore advisable to apply it by means of a pressure lubricating system, or compression type grease cups. Ball and roller bearings are lubricated by packing the grease into the bearing space. Because of its resistance to flow the use of calcium soap grease, is of great advantage on bearings required to operate without attention for comparatively long periods of time. The grease is not easily displaced by the centrifugal action of rotating parts.

Calcium soap greases are not used as gear greases, except under certain conditions. In an automobile transmission a certain amount of stringiness is necessary so that the grease will follow the gears and this property is lacking in lime base greases. Calcium soap greases have less stability than some other types and should not be used in hot weather or under hard and long driving conditions, however, this type of grease finds particular favor, due to its low yield value, in cold districts where ease of shifting gears is an important factor.

Sodium Soap Products

Soda base greases are used largely for gear lubrication, and high temperature bearing lubrication. Sodium soap is water soluble, and for that reason its grease products cannot be used where they are apt to come in contact with any great amount of water.

The gear greases are mixtures of heavy bodied mineral oils, with from one-half of 1 per cent to 10 per cent soap, and varying in consistency from fluid to semi-solid. The gear speed is of prime importance in determining the grade of lubricant to be used. For either high or low speed, the lubricant should possess, pronounced cohesive property, and a readiness to flow. A grease sufficiently cohesive will at all times follow in a stream with the moving gear, providing, it has sufficient adhesive character to establish contact with the gear at the operating speed. The degree of cohesion is controlled largely by manufacturing procedure, and to a lesser extent by a selection of the fatty ingredient.

The high temperature lubricants contain higher percentages of soap than the gear greases. The amount ranges from 15 to 50 per cent. These greases are capable of withstanding temperatures up to the distillation point of the mineral oil which they contain, without separation of soap and oil. Soda base greases have a higher liquefaction point than any other soap-oil mixture, and show less change in consistency over the temperature range approaching the liquefaction point.

Soda Base Greases

There are two distinct types of soda base, high temperature lubricants. Fiber greases which constitute one type, are so named because of their peculiar fibrous texture. The liquefaction temperatures of the fiber greases range from approximately 350° F. to 450° F. The greases are of medium hardness and can be conveniently used in ordinary compression cup lubricating systems. Dehydrated sodium soap greases constitutes the other type of high temperature lubricants. They have a much harder consistency than fiber greases, and show less change in consistency over the temperature range approaching the liquefaction point. The change from solid to liquid is in fact, very abrupt.

The manufacturing procedure for all sodium soap products, is essentially the same. Accurately proportioned amounts of the fatty ingredients and caustic soda are charged into the mixing kettle. An amount of mineral oil is added before the saponification reaction is completed to soften the soap stock, and thus expedite the introduction of the balance of the mineral oil. After complete saponification, the soap stock is cooked to the desired texture and the balance of mineral oil added.

Dehydrated greases, after addition to the mineral oil, are heated to a temperature above the liquefaction point (400° F. or higher), and drawn to block molds to cool.

The characteristic sponge texture, which is an indication of the cohesive character, is controlled largely by the amount of water and glycerin left in the soap stock.

Direct Fired Kettle

The use of the direct fire heated kettle is advantageous in manufacturing this class of greases as the higher temperatures possibly permit better control of dehydration. As a matter of fact this type kettle is essential in the preparation of the very high temperature greases which must be moisture free. The ordinary gear greases are very satisfactorily made, however, in the open steam jacketed kettle. The pressure kettle finds little application in the manufacture of this class of grease although the operation may be satisfactorily carried out. The pressure mixer will not produce a dry soap because the water necessary for hydrolysis cannot escape, therefore, no saving in time is effected as the reaction takes place quickly in an open kettle.

Aluminum Soap Greases

Aluminum base greases, compare closely in texture, and lubrication adaptability to calcium soap greases. They are often referred to as solidified oils or transparent cup and pressure gun greases. Aluminum oleate blended with a low viscosity mineral oil is commonly known as mineral castor oil.

These greases are characterized by their brilliant, transparent appearance, and stability at high temperatures. They offer, by far, the most perplexing problem in grease manufacture. Every ingredient plays a major part in shaping the physical properties of the resultant product. The aluminum soap of stearic acid, incorporated with a low viscosity mineral oil, yields a grease product of low cohesive character as evidenced by its short shear, buttery texture. The aluminum soap of oleic acid, incorporated with the same mineral oil, yields a product of extremely high cohesive character, and pronounced rubbery texture. Contrasted with soaps herein discussed, aluminum soap, when incorporated with an extremely high viscosity oil, yields a grease of softer consistency than when incorporated with a low viscosity mineral oil. The rate of cooling also has an important bearing on the grease texture and consistency.

It is necessary for the grease manufacturer to make an extensive study of the mineral oil, of the fatty ingredient and also of the cooling rate best suited for the grade he wishes to market.

The manufacturing procedure for aluminum soap, is different than that of other soaps, in that it is a product of a substitution reaction. The fat is first saponified with caustic soda. By addition of an aqueous solution of an aluminum salt, the sodium radical of the soap is replaced by aluminum. The water insoluble aluminum soap separates, thus permitting the solution containing the sodium salts to be drawn off. By repeated washings, the aluminum soap is freed entirely of excess saponifying agents.

Aluminum soap greases, when properly made, possess all the favorable characteristics of calcium soap greases, and are without the unfavorable characteristics including the possible presence of abrasive substances.

Lead Soap Greases

Lead base greases, at the present time are employed wholly for gear lubrication. The soap is very deficient as a mineral oil thickener, in fact, when blended with a heavy bodied mineral oil, the viscosity (measured at 210° F.) may be decreased. Many lead base gear greases now on the market contain either calcium, sodium or aluminum soaps for the purpose of increasing the body.

Lead soap has an exceptionally high specific gravity as compared with other soaps. It is apparent from observations that the lead base lubricants possess a high degree of metallic adhesion, which may be the responsible factor of its excellent lubricating performance under heavy load at high speeds. However, offsetting this advantage is the fact that lead soap greases cause a definite lapping action on the mechanical parts so lubricated.

The usual procedure of manufacture of these greases is the fusion method, wherein the saponifiable oil is heated in direct contact with lead oxide. The objection to the process is that, invariably, an amount of uncombined lead oxide remains in suspension in the finished grease. By employing the substitution method of manufacture the resulting lead soap is entirely free from suspended solids.

Proper selection of saponifiable oil is very important in the manufacture of lead soap. The frequently occurring fatty acids of the Acetic series, yield lead soaps which are but slightly soluble in petroleum fractions, whereas, the lead salts of the frequently occurring members of the oleic series are quite soluble. Fats of high iodine absorption value yield the more oil soluble lead soaps. Fish oils and oleic acid are commonly used.

Sulphur is sometimes used in conjunction with lead soap for manufacturing gear lubricants. The sulphur in some lubricants is chemically combined with the soap, and in others it is physically suspended in the grease body.

There is considerable controversy at the present time in regard to the value of sulphur either suspended or combined as a lubricant.

Investigation and Development

There are possibilities for research in practically every field and with practically every product, and grease is no exception to this premise. In fact, it would seem as though less attention has been paid to greases than to a great many other petroleum products. Investigation may travel in two directions: One concerned with application in the field of lubrication, and the other with raw material and manufacturing methods.

So far as known very little investigation has been conducted, concerning the relative lubricating value of soap thickened and uncombined mineral oils. In fact, the manufacturer of lubricants, until recently, has not been called upon to produce products of high lubricating value.

The automobile industry, at the present time, demands a more serviceable gear lubricant. The introduction of spiral bevel gears replacing the pinion type, presents a more severe condition of interfacial contact. Due to the design of the gear there is increased wear because of greater metal to metal contact. The rubbing action is extended over an increased distance wherein there is no contact of the face with the lubricant body. It is evident that the condition calls for a lubricant possessing a high degree of metallic adhesion, in order to form the initial film. The effect of abrasive substances is readily seen.

In the investigation of other problems as well as the one just mentioned it is questionable if investigators have attached sufficient importance to the effect of abrasive elements on lubricating film strength. In order to accurately determine the lubricating value of any type of lubricant it appears that a study of the abrasive content is of prime importance.

It is evident that all soap oil mixtures are apt to contain excessive amounts of saponifying agents, which are abrasive in action. The substitution method of soap manufacture yields a product free from all suspended solids.

The percentage of abrasive content of a grease product is difficult to determine. It is therefore necessary to investigate the method of manufacture of a sample as well as the lubrication performance before an index of value can be attached to any one type of soap lubricant.

A straight mineral oil lends itself readily to determination of the amount of abrasive material contained. The determination of the ash content is an accurate procedure, for uncombined mineral oils but is not applicable for soap oil mixtures, since it includes the metal in combination as well as the amount in suspension.

This is one problem and there are many others. The present age has rapidly developed myriad types of machinery with many complex lubrication problems and in order for grease to fulfill its part, intensive study will be necessary in order to make the proper applications.

The lubrication problems, however, cannot be solved through investigation of application alone but must be carried back through manufacturing technique, even to the raw materials involved. Adequate investigation of raw materials and analysis of resultant products can be profitably made in the laboratory using small scale equipment. The results of these pilot tests may be transferred to full scale equipment with beneficial results. Many improvements in manufacturing methods are possible; for instance, the method commonly used now for drawing and cooling aluminum base greases is certainly open to betterment. While rapid strides have been made within the past few years in grease manufacture, it is entirely possible through intensive, continued research to make many more improvements which will lower operating expenses, improve quality, develop new, specialized grades and consequently rapidly expand the field for grease application.

CALIFORNIA OPERATORS MADE NEW RECORDS

(Continued from Page 105)

able conditions. These include the holding of fee title to the property involved and a loose grained porous formation.

The Associated Oil Co., like the Union and Standard, has been extremely progressive during the past several years. Beginning with its discovery of the East Coyote Field in 1911, the Associated has achieved an enviable reputation. In 1921 the Associated's No. 1 Butterworth in the Santa Fe Springs Field of Los Angeles Basin was the deepest producing well in the State of California at that time. It was producing from the then unheard of depth of 4,682 feet. In 1923 the Associated's No. 2 Green had the distinction of being the largest producing well finished in southern California under complete control. It was flowing 13,835 bbls. per day. In 1929 the Associated discovered the Clarke zone, which was subsequently proven quite prolific in the Santa Fe Springs Field. In the Kettleman Hills Field of Kings County the Associated completed its No. 1 Whepley in a total elapsed time of only 297 days from spud to completion. The Associated also holds the state record for the movement of crude oil by tank cars. This record was established at Huntington Beach during the period of peak production. The tank car loading record was 136 cars loaded and dispatched within 24 hours. For several weeks the Associated was obliged to load in excess of 50 cars per day pending completion of its pipe line.

ATMOSPHERIC AND VACUUM DISTILLATION

(Continued from Page 70)

the proper top of tower temperature, as the side streams will automatically, because of these control valves, accommodate themselves to varying quantities of vapor passing up and reflux flowing down. This arrangement serves to greatly steady the operation of the tower, and requires less supervision and changes in adjustment when the throughput varies. The only points of control are then the heater outlet temperature and the temperature at the top of the tower. The tube still outlet temperature is under the control of the stillman. The top of tower temperature is controlled automatically by instruments provided for that purpose.

Internal stripper sections are used, requiring less ground space. Where strippers outside the tower are used, additional steam must be supplied to make up the heat lost by radiation. The chief advantage of the outside stripping section is when the point of take-off of the side stream is uncertain. In each type of stripper the reflux removed as a side stream flows down over a series of trays meeting an upward flow of superheated steam which gently heats the oil and reduces the oil vapor pressure. The lighter oil vapors and steam are returned to the tower immediately above. The inside arrangement keeps the stripping section in contact with the oil and steam vapor slightly warmer than the oil contained, and thereby conserves steam.

It is important to have a uniform flow of liquid over the plate to insure thorough contacting of the ascending vapor with down flowing reflux. The plates are therefore made up of rectangular sections containing long narrow nozzles covered with caps of the same shape. The space between the rectangular sections and the wall of the tower is filled in with cast iron or wrought steel pieces of suitable shape, or is used as downcomers. A notched weir evenly distributes the liquid at the entrance side of the plate and a weir at the exit side retains liquid at a proper depth on the tray. Flowing over this exit weir the liquid drops through the chamber formed by an apron and the wall of the tower into a seal pan and so across the plate below in the opposite direction.

It is important to provide a vapor heat exchanger having long rectangular nozzles for good distribution of vapor over the tubes of the cooling surface without excessive drop in pressure due to friction or baffles. This applies to atmospheric stills, but is even more important in vacuum stills where it is essential to maintain the absolute pressure at the point of flash as low as possible. At the bottom a chamber is fitted for separation of oil condensate from noncondensable gas and steam. The oil is withdrawn from the nozzle at the bottom and the noncondensable gases and steam are removed through the side nozzle. This type of condenser is chiefly used in vacuum stills where gas oil is condensed at a temperature above that of the steam and noncondensable gases which pass to the barometric condenser and steam jet vacuum pumps.

It is sometimes desirable to provide an atmospheric unit running to heavy flux bottoms, taking cylinder stock overhead as a side stream. This is usually carried out as a single flash distillation, using the lighter vapors to reduce the vapor pressure of the heavier fractions, permitting vaporization of the heavier oils at a lower temperature than would be possible had the lighter vapors been removed. However, for most Mid-Continent crudes, even when retaining the lighter vapors, the temperature required to recover all of the cylinder stock is still too high to insure good color stability in the gasoline and kerosene. But by the addition of a chamber into which the bottoms after being withdrawn from the atmospheric tower are flashed under vacuum, a very satisfactory yield of cylinder stock can be obtained at temperatures not harmful to the color of the lighter streams. The application of this auxiliary flash chamber is illustrated in Figure 1, although here the auxiliary flash chamber is attached to the vacuum tower but its application to an atmospheric tower is essentially the same.

Two-Stage Combustion Unit

Figure 1 illustrates a two-stage atmospheric and vacuum unit in which the maximum yield of cylinder stock overhead can be secured from any type of crude without endangering the color of light overhead products. These are removed in the atmospheric tower at a temperature not exceeding 600° F. The bottoms usually including gas oil are then passed hot to the heater of the vacuum stage and their temperature increased to evaporate the heaviest lubricating stock. For some Mid-Continent crudes 770°-778° F. is sufficient. Others, such as Kansas, requires temperatures exceeding 800°. Fortunately, such crudes do not break and crack easily under such temperatures.

On this unit the vacuum tower is supplemented by a flash chamber into which the bottoms from the vacuum tower pass and are flashed under a somewhat lower absolute pressure than can be obtained in the main tower at the point of flash because of the pressure drop necessary to pass the vapors through the bubble trays to obtain good fractionation. The auxiliary tower is direct connected through a condenser to the jet condenser and steam jets, thus producing a lower absolute pressure at the point of flash than in the main tower. The overhead cylinder stock is condensed and combined with the cylinder stock from the stripping section of the main tower.

Atmospheric Unit

Table No. 1 presents data obtained on an atmospheric unit when running Seminole crude to flux bottoms.

TABLE 1—PERFORMANCE DATA ON AN ATMOSPHERIC UNIT RUNNING SEMINOLE CRUDE

Throughput	6,300 B/D
Gravity	39.7°A.P.I.
Still inlet	350°F.
Still outlet	800°F.
Superheated steam	750°F.

	Yield %	Gravity °A.P.I.	Color
Gasoline (442 e.p.)	39.5	60 0	30+
Kerosene	4.4	41.4	17
Gas oil	25 1	36 0	..
Wax distillate	10 3	29 6	..
Cylinder stock	8 7	....	(*)
Bottoms	9.8	12 0	..
Loss	2 2	....	..

*Viscosity at 210° F. 98.

The addition of a flash chamber increased the yield of cylinder stock from 8.7 per cent to 13.4 per cent, the cylinder stock from the vacuum chamber having a viscosity of 138 seconds at 210° F. The bottoms were reduced to 6.5 per cent. The conclusion drawn from the data presented may well be that to always insure good color of the lighter products, as well as an increased yield of overhead cylinder stocks of higher flash, a vacuum flash chamber should be installed as an auxiliary to the main tower.

The curves in Figure 2 are made from distillation of samples of streams recovered from atmospheric distillation of Seminole crude when running to 15.9 per cent bottoms with a tube still temperature of 750° F. At this temperature the color of the gasoline was 30+, and the kerosene 24. At higher temperatures the color of these streams gradually fell off, and at 800° F. tube still temperature the gasoline was 22 color and the kerosene 17 to 18 color.

A four-day run on Seminole Mid-Continent crude through a two-stage atmospheric and vacuum unit, like that illustrated by Figue 1, using an auxiliary vacuum tower to flash the bottoms from the main vacuum tower is tabulated in Table No. 2.

TABLE 2—PERFORMANCE DATA ON TWO-STAGE ATMOSPHERIC AND VACUUM UNITS WITH AUXILIARY FLASH TOWER

Temperature—°F.—	
Oil ent. atmos. tube still	361°F.
Oil lvg. atmos. tube still	599°F.
Oil ent. atmos. tower	572°F.
Vapors top of atmos. tower	303°F.
Oil ent. vacuum tube still	528°F.
Oil lvg. vacuum tube still	774°F.
Oil ent. vacuum tower	750°F.
Vapors top of vacuum tower	407°F.
Oil ent. flash tower	687°F.
Vapors lvg. top flash tower	678°F.
Bottoms lvg. flash tower	676°F.
Throughput (2 units)	27,130 B/D
Fuel used (by volume)	2.36%
Steam Used (2 units)—	
Total live steam (pumps and jets)	17,664 lb./hr.
Total exhaust steam used	17,166 lb./hr.
Water used	5,980 G.P.M.

Yields—12,130 bbls. per day—	%
Total crude	100.00
Gasoline	28 47
Kerosene	14 83
Gas oil	10 48
Wax distillate	26 77
Heavy wax distillate	5.17
Cylinder stock (—150 vis. @ 210° F. Fl. O. C. —535°F.)	6 86
Flux (—10.1° A.P.I., 108 M.P.)	6.89
Loss	.53

The yields for a corresponding run with Seminole crude without the flash tower are tabulated in Table No. 3.

TABLE 3—YIELDS FROM TWO-STAGE ATMOSPHERIC AND VACUUM UNIT WITHOUT AUXILIARY VACUUM FLASH TOWER RUNNING 13,518 BBLS. PER DAY

Yields—	%
Total crude	100.0
Gasoline	28 6
Kerosene	12 0
Gas oil	13.4
Wax distillate	27.4
Wax slop	4.2
Cylinder stock (151 vis. @ 210° F., 525° F. flash)	5 6
Flux (11.1° Be., 94 M.P.)	6.9
Loss	1.9

It is evident from Tables No. 2 and No. 3 that to obtain the best color of light products and the maximum yield of cylinder stock a two-stage atmospheric and vacuum unit, supplemented by a vacuum flash tower as an auxiliary to the main vacuum tower, is required. However, the increased yield of cylinder stock is so small that the advisability of the increased investment would depend largely on specific conditions.

Table No. 4 lists the performance when running various crudes in a two-stage atmospheric and vacuum still similar to that shown in Figure 1, but without the auxiliary flash tower.

The range of operation shown by Table No. 4 indicates the flexibility of this construction, which is largely the result of positive control of the heater and tower. The design and arrangement of bubble trays and stripping sections, and the weir type of control valves used are largely responsible for close control of fractionation. It is evident from data submitted that a unit of this type can function economically over a wide range of operations from light topping at one extreme, to running to heavy flux bottoms at the other, requiring only a slight change in adjustment. Such a unit therefore can be considered as a general utility unit, and thus marks a distinct increase in usefulness over the earlier types of tube still and tower which were definitely limited to a specific performance.

TABLE 4—PERFORMANCE DATA ON A TWO-STAGE ATMOSPHERIC AND VACUUM UNIT WHEN PROCESSING VARIOUS CRUDES

	Test Number— 1 Venezuela	2 Caddo	3 Okla. City
Kind of crude—			
Gravity of crude, °A.P.I.	17.7	23.7	38.2
Duration of test, hrs.	120	16	120
Throughput, B.P.D.	11,870	9,480	8,520
Fuel used, per cent throughput	1.64	....	2 31
TEMPERATURES, °F.—			
Oil ent. atmos. tube still	330	380	340
Oil lvg. atmos. tube still	615	590	580
Vapors top atmos. tower	252	285	225
Steam ent. atmos. tower	780	725	700
Oil ent. vacuum tube still	570	525	510
Oil lvg. vacuum tube still	650	810	820
Vapors top vacuum tower	...	325	325
Steam ent. vacuum tower	575	725	675
Steam Used, lb./hr.—			
Total live steam	9,300	...	8,830
Exhaust steam atm. tower/G. crude	.06	...	...
Exhaust steam vac. tower per gal. reduced crude	.14	...	...
Water used, G.P.M.	2,540	...	2,540
Yields, per cent—			
Naphtha	6.91	1.46	30.14
Refined oil	8.81	5 13	20.75
Gas oil	16 39	29.26	5.16
Light lub "A"	13 98	....	...
Heavy lub "B"	3 66	...	....
Motor oil	....	42.14	...
Paraffin distillate	....	....	24.80
Cylinder stock	....	4.07	9.32
Heavy flux	49.13	18.35	9.08
Gas and loss	1.12	+.41	.75

Successful runs were also made on Lago crude running to 50- 60 Pen. Btms.
80-100
100-120
900-1,200 Vis. Btms.
470-490 flash Btms.

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SAN ANTONIO, Tex., Mar. 9.—At least 1,500 of the 2,400 or more members of the American Association of Petroleum Geologists are expected to be in attendance at the annual gathering in San Antonio, March 19, 20 and 21. The local arrangements for the gathering have been made by the San Antonio section of the association of which Dr. D. R. Semmes, consulting geologist, is the president.

D. R. Semmes

President of San Antonio, Tex., section of American Association of Petroleum Geologists.

Several side trips have been arranged by the local section and the routes have been graphically mapped.

The chairmen of local committees follow: Chairman of general committee, D. R. Semmes; technical program, Charles H. Row, Sun Oil Co.; finance, H. H. Cooper, consulting geologist; reception, L. F. McCollum of Humble Oil & Refining Co.; entertainment, L. W. MacNaughton of Amerada Petroleum Corp.; ladies entertainment, J. B. Whisenant, consulting geologist; registration, E. H. Finch, Atlantic Oil Producing Co.; trips, J. M. Dawson of Gulf Production Co.; transportation, Ward W. Kelley, consulting geologists; exhibits, J. D. Hedley of Barnsdall Oil Co.; publicity, R. F. Schoolfield, consulting geologist; golf, Don Danvers of Sinclair Oil & Gas Co.

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403 Brown Bldg.,
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THE OIL AND GAS JOURNAL
TULSA OKLAHOMA

ROYALTIES—PRODUCTION

ROYALTY ON STRUCTURE, vast spread under drilling well now spudding northeast of Rusk, Gregg area, on theoretical shore line, near Sinclair big block Harrison County, East Texas. Between Moncrief Bateman, and Caddo field, being around 15 miles west of Caddo area. Many wells to start in Harrison. Investors, brokers in Canada and U. S. write or wire James R. Haynes, Grantville, Kansas.

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MAKING geological and geophysical survey East Texas, Gregg-Rusk Counties, and further can furnish some royalties and leases; reliable connections solicited; very best of reference furnished. C. E. Deaton, 205 Campbell Bldg., Longview, Texas.

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Stabilization Expected in Chicago Area

Decline Had Been Discounted and Recovery Looked for as Prices Reach Bottom. Effect on Contract Situation

By C. O. Willson

CHICAGO, Mar. 9.—Open market quotations on practically all refined products in this territory slumped the latter part of last week when the general reduction in gasoline tank wagon and service station prices including kerosene tank wagon throughout the Middle West and the lower posted crude oil prices in the Mid-Continent became known. However, the decline in prices was not as much as expected by many and it is felt that within a few days prices can be stabilized around their present levels provided there are no other important developments of bearish nature in the crude production and refining branches of the industry.

The reduction in the crude oil and tank wagon prices was not a surprise to the trade so far as this territory was concerned, The widespreads between refinery tank car and tank wagon quotations has presaged a decliné in the latter and it is welcomed by many of the large and small distributors. The widespreads have permitted the so-called "tank car" distributors to reduce service station prices as much as 5 and 7 cents a gallon under the regular market as observed by the larger distributors. Various methods have been used in an attempt to rectify these conditions with little success and many of the larger companies since the first of the year have come to the conclusion that the only possible solution was a reduction in tank wagon and service station prices. The same situation applied to the kerosene tank wagon market.

As expressed by one marketer the changes of the past week "at least bring us nearer the bottom which it is necessary to reach before there can be any recovery."

Many feel that within the next few days it will be apparent that the refinery market on the principal products had already discounted the decline in crude oil and retail prices and the next important change in quotations will be advances rather than a continued decline which has been characteristic of the market over the past two years. Both buyers and sellers have been expecting the declines in crude oil and tank wagon prices and while this feeling was prevalent it was impossible to stop price declines. The spring demand for gasoline will shortly be under way and this should aid in strengthening prices. While no large increase in other products is anticipated many believe that they will also react favorably within the next 30 to 60 days.

Contract Situation

The most important result of the reduction in gasoline tank wagon and service station prices had to do with the contracts. The open market reduction following the cut did not exceed one-fourth cent a gallon and many sellers have not yet made any changes in their prices either on gasoline or kerosene for spot movement.

But in most cases the refiners who have contracts with jobber outlets in all states of the Middle West will absorb all of the 2-cent decline in station prices. Practically all of the refiners in the Middle West and Mid-Continent have these contracts and the bulk of the gasoline which is not sold through company-owned stations is handled on this basis.

Over the past year these contracts for the most part have been favorable for the refiner when compared with the prevailing spot market. The decline of the last week, however, brings many of them within the range of the spot market and in some cases they are lower.

These contracts vary as to their terms. Contracts made up to a few months ago usually guaranteed the jobber a 5-cent minimum spread between the delivered tank car cost and the service station price. Some provided a split between buyer and seller of any spread in excess of the 5-cent maximum while others permitted the buyer to purchase on the open market as shown by published quotations when that price was below the contract basis.

Due to the widespreads which have prevailed in recent months between the tank car and service station prices there has been a tendency to increase the minimum spread allowed the jobber. Many contracts now guarantee the jobber a 5½ or 6-cent spread under the service station price. Cases are cited in which a few refiners in their anxiety to get regular outlets have exceeded the 6-cent figure with other special features such as protection in local price wars.

With the declines of the past week these refiners who have given these excessive margins are now placed in a position of holding the preverbial "sack." A couple of examples will suffice to show the working of these contracts. The retail price on the regular grade of gasoline in Chicago at this time is 15 cents. Under a contract with a 5-cent minimum guarantee to get the tank car price at an Oklahoma refinery it is necessary to subtract the sum of the 5-cent guarantee, 3-cent gasoline tax and 2.38-cent freight or a total of 10.38 cents. Subtracting this 10.38 cents from the 15 cents leaves 4.62 cents as the Oklahoma (Group 3) net to the refiner. The seller who has guaranteed a 6-cent margin receives 3.62 cents, if an Oklahoma refiner. It is claimed that some of the newer contracts in Chicago exceed the 6-cent guarantee so that they are now netting the refiner around 3 cents a gallon.

The new service station price at Minneapolis is 16.2 cents. The freight rate from Oklahoma to that point is 2.77 cents and gasoline tax is 3 cents. With a 5-cent minimum margin the contract price is 5.43 cents and 4.43 cents in the case of a 6-cent margin. With a 6-cent margin at Detroit the contracts are now netting the sellers 3.1 cents, basis Oklahoma.

Some contracts provided for cancellation by buyer and seller, while others are on a yearly basis. With a recovery in the spot gasoline market many of these contracts no doubt will be canceled.

Gasoline

U. S. Motor gasoline was available today direct to the trade as low as 3½ cents, basis Oklahoma. This low-priced material was available from several sources in the Mid-Continent and the Middle West. The bulk of the cheaper material, however, seemed to be coming from the North Texas group of refiners. Prices on this grade ranged up to 4¼ cents with a few large refiners quoting nominal prices of 4½ and 4¾ cents.

There has been practically no trading the past few days in the higher gravities. A 400-endpoint grade has sold direct as low as 3¾ cents. The 390 endpoint has been offered with few takers at 4⅛ and 4½ cents and the 375 endpoint at 4⅜ and 4½ cents.

Naphtha and natural gasoline blends are moving slowly at prices from one-eighth to one-fourth cent under last week's quotations.

Kerosene

The expected spring pickup in demand for kerosene has not materialized. However many in the market feel that the 2-cent reduction in the tank wagon prices through the Middle West will stimulate the demand. The kerosene prices at many of the principal consuming points has been higher than the gasoline tank wagon price when the tax is subtracted from the latter and refiners have been using gasoline in their tractors rather than kerosene as a result. Gasoline used in agricultural work is generally exempt from the gasoline tax. Special grades of distillates have also been sold as substitutes for kerosene in tractor fuels. With the new prices kerosene will be placed in a more favorable position from a competitive standpoint and the actual consumption should increase.

The 41-43 water white grade of required flash and burning test is generally selling direct to the trade at a low of 2⅞ cents. Other grades not meeting all the usual specifications have sold as low as 2½ cents to resellers. The higher gravity grades are bringing one-fourth cent more.

Furnace Oils

The furnace oil market is exceedingly slow. Locally the situation was not helped any when the Standard of Indiana announced a new schedule for retail deliveries on March 5. Following was the old prices:

	Old
1 to 99 gallons	9
100 to 499 gallons	8
349 gallons and above	7⅛

Under the new schedule the price is 7 cents in the entire Standard of Indiana territory for dumps of 50 gallons or more.

This has also served to narrow the spreads in the sale of furnace oils. Good grades of zero cold test distillates of from 36 to 40 gravity are now available as low as 2½ cents to the trade.

Fuel Oil and Gas Oil

The fuel oil market is so unsettled that it is practically impossible to determine the going market. Many refiners have not officially announced any changes in their quotations, but a large buyer would not have any difficulty securing important price concessions for spot delivery.

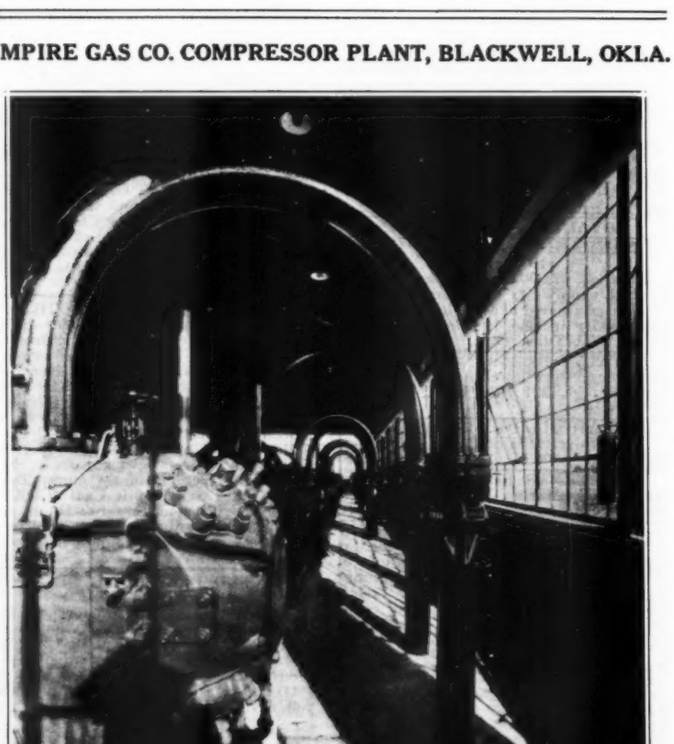
There is a feeling among some in the trade that the lower crude oil prices will depress the fuel oil market more than any other product. To get outlets for the crude oil it is feared that large quantities of fuel will be thrown on the market regardless of price. There has been no definite development to support this feeling but it is a market factor at this time.

Zero cold test grades of good viscosity generally start at a low of 45 cents and range up to 80 cents for the higher gravity grades. High cold test grades can be bought from 5 to 10 cents a barrel under the zero grades.

Lubricants

The motor and industrial demand for lubricants continues slow. Some price shading is reported in the finished grades of oils and also the bright stocks and neutral oils.

EMPIRE GAS CO. COMPRESSOR PLANT, BLACKWELL, OKLA.



Piping on compressor end. Merco Nordstrom valves used on compressor lines.

SAFETY MEN ELECT

Two chapters of the Petroleum Safety Council of the Mid-Continent Oil and Gas Association have elected new officers for 1931. For the Gulf Coast, J. L. Risinger, Magnolia Petroleum Co., president; H. S. Stapleton, Vacuum Oil Co., vice president; P. E. Keegan, Shell Petroleum Corp., secretary-treasurer (re-elected). Kansas-Oklahoma chapter, L. R. Hodell, Carter Oil Co., president; R. J. Lauder, Shell Petroleum Corp., vice president, and G. O. Lockwood, Empire Companies, secretary-treasurer. Officers in both chapters were voted in by acclamation.

East Coast Market Reverses Its Position

Steady Tone Is Succeeded by Weak and Unsettled Condition, With Posted Prices Reduced and Price-Cutting Reported

By A. E. Mockler
New York Bureau, The Oil and Gas Journal, Rooms 1919-21, No. 154 Nassau Street

NEW YORK, Mar. 9.—The East Coast refinery gasoline market has almost completely reversed its position during the past week, and from the steady and strengthening market of the latter part of February has changed into an unsettled and weak position. Posted prices, which prevailed on the greater part of sales a fortnight ago, have been cut a half to three-quarters of a cent per gallon, and price cutting is reported even under this lowered basis.

The break in refinery gasoline prices came just prior to the cut in crude oil initiated by Stanolind, and this latter development has tended to accentuate the already disturbed position of gasoline in East Coast markets.

The latest developments in the gasoline situation would seem to menace the stabilization program in retail markets inaugurated by leading marketers at the start of the year, but notwithstanding unfavorable conditions it is indicated that marketers will make a determined effort to hold the ground already gained in their campaign, and will endeavor to effect further stabilization.

With the exception of the general break in refinery gasoline, there was little change in the refined products group. Wax weakened further, but a fairly steady undertone ruled on other products, and the lub oil market had developed a stronger undertone, reflecting seasonal recovery in demand.

Refinery Gasoline

The cut in refinery gasoline prices initiated by Atlantic Refining Co. was followed by New Jersey Standard and has now become general, and the tank car market, which was showing signs of stabilization early last month, is again in an extremely unsettled position. The posted price for U. S. Motor gasoline in the New York harbor district is now held at 7 cents per gallon by major interests but one small refiner is openly quoting 6¾ cents in tank car lots, and it is reported that business has been done at 6½ cents. One unconfirmed report indicated that California U. S. Motor had sold here at 6¼ cents, tank car, but it is believed that this sale was but an isolated instance in which a limited quantity of distressed gasoline was liquidated.

Price cutting in refinery gasoline is not confined to the New York harbor district, however, prices having been readjusted downward at practically all of the shipping centers in East Coast territory.

Failure of congressional action to limit imports of gasoline, and the further drastic cut in Mid-Continent crude oil prices combined to bring about a pronounced reversal in sentiment among Eastern refiners during the week and unless some immediate stabilization is forthcoming, maintenance of the gasoline market at 7 cents appears doubtful.

There was a continued good demand for gasoline during the week. The half-cent cut made by Atlantic Refining during the previous week had naturally affected buying operations of jobbers, but many of the local companies were meeting the Atlantic price before formally lowering their own posted quotations, so tank car demand suffered but a brief slackening. Continued increase in gasoline stocks in East Coast territory has been noted during the past several weeks, holdings as of February 28 totaling 7,939,000 bbls., against 7,745,000 bbls. at the close of the previous week and 5,868,000 bbls. of gasoline on hand at refineries in this area at the start of the year.

Chaotic conditions which loom in the refinery market have reacted against sentiment in tank wagon circles, and marketers are extremely doubtful regarding their ability to successfully continue the program of stabilization inaugurated at the start of the year.

Stability in tank wagon markets, it is pointed out, requires a corresponding degree of soundness in the tank car market, and this is now lacking. Price cutting in refinery sales, whereby gasoline is being sold at as much as a half cent under the lowered posted price, gives independent marketers a full cent per gallon differential under the basis on which the tank wagon and service station prices are based. With this condition obtaining, it appears probable that price-cutting competition will again become irksome to the principal marketers.

There has been a well-sustained demand for gasoline throughout the territory during the week. While consumption is satisfactory, competition is still excessive, and it is a question as to whether the seasonal gain in consumption will materialize soon enough to avert a general cut in the retail price structure.

Kerosene

Tank car movement of kerosene has shown a little improvement during the past week, but the market is still in unsettled position. The posted price for 41-43 water white holds at 6½ cents per gallon in tank car lots at refineries, with business going through at 6¼ cents. With the lower gasoline market, however, it is expected that kerosene will also ease off, and buyers are looking for 6-cent offerings.

Consumption of kerosene is picking up, and the tank wagon market is in fairly steady position. Marketers look for an active demand during the spring season.

Export inquiry for both cased and bulk kerosene is quiet locally, with business confined principally to small quantities for immediate shipment.

Paraffin Wax

Renewal of export inquiry for wax on a fairly broad scale brought about a better feeling in the local market last week, but the volume of actual new business continued limited. The only price change during the period was a reduction of one-eighth cent per pound in 125-127 a.m.p., bringing the market down to 3⅜ cents per pound.

Domestic consuming manufacturers continue to limit their purchases to small lots for prompt and nearby delivery, and the volume of forward booking is considerably under normal for this season of the year.

The statistical position of the wax market continues far from favorable. January production totaled 42,560,000 pounds, against 36,120,000 pounds in December. Export volume showed a sharp decline in January, totaling 22,063,000 pounds, against 27,625,000 pounds in the preceding month and 32,326,000 pounds in January, 1930. Stocks on hand January 31 amounted to 233,044,000 pounds, against 204,209,000 pounds held on the same date last year. Domestic demand, however, showed an encouraging gain in January, amounting to 22,690,000 pounds, as compared with 16,098,000 pounds in the previous month and but 7,637,000 pounds in January, 1930.

Lubs

Spot trading showed a slight gain in the cylinder oil market during the week, and operators were looking for a broader market for nearby positions. Compounders and blenders are carrying but limited inventories at the present time, and it is felt that these buyers will be forced to do considerable replacement buying to take care of their spring requirements. Prices remained unchanged throughout the week, and, while the undertone was still irregular, price cutting appeared somewhat on the wane.

Red and pale oils met with a continued steady demand, quotations remaining unchanged.

Refiners are making some progress in their campaign to reduce lub oil output. Production during January totaled 2,441,000 bbls., as compared with 2,509,000 bbls. in the preceding month and 2,880,000 bbls. in January, 1930. Domestic demand showed a substantial gain during the month at 1,715,000 bbls., against 1,458,000 bbls. in the previous month and 1,288,000 bbls. in January, 1930. Exports, however, were but 687,000 bbls., a substantial decline from the 908,000 bbls. exported in January of last year. Stocks held by refiners as of January 31, this year, amounted to 11,013,000 bbls., against 10,971,000 bbls. at the close of December and 8,956,000 bbls. on hand January 31, 1930.

Furnace Oil

Colder weather has brought about a heavier movement of domestic heating oils, and marketers who had been inactive in the tank car market during the past few weeks were again buying prompt shipment oil in fair volume.

Retail prices for all grades of furnace oil remain unchanged in local territory, and the refinery market is also steady, with the leading seller quoting domestic heating oil, minimum 32 gravity, at 4½ cents per gallon in tank cars, refinery terminal.

Fuel Oil

Bunker "C" has shown a fairly steady tone during the week at $1.05 per barrel, bulk, refinery terminals, a good movement being recorded. Despite the substantial cut in production and refinery holdings, however, the downward reaction in gasoline prices and the cut in crude quotations has tended to soften the fuel oil market, and interests which a few weeks ago were quite bullish on the price outlook have been obliged to revise their opinions somewhat.

According to the Department of Commerce, January production of fuel and gas oils by domestic refiners totaled 29,174,000 bbls., a daily average of 941,000 bbls., a considerable reduction from the 33,213,000 bbls., or 1,071,000 bbls. per day, produced in January, 1930. Stocks on hand at the close of January were 33,977,000 bbls., against 37,007,000 bbls. held December 31, and 35,873,000 bbls. on January 31, 1930.

East Coast refiners continue to reduce their fuel and gas oil holdings, stocks as of February 28 totaling 7,300,000 bbls., against 7,331,000 bbls. at the close of the previous week and 9,601,000 bbls. at the start of the year.

Diesel Oil

Gallonage is holding at satisfactory levels in East Coast markets, and refiners continue to hold the posted price at $1.85 a barrel in bulk at marine terminals. Most sales, however, are made at $1.91½ per barrel, this being the quotation on oil barged alongside within harbor limits.

Contract withdrawals by some of the larger marine interests are larger than at this time last year, and this increase has tended to counterbalance the falling-off in sales to some of the smaller lines. Aggregate volume, it is reported locally, is running somewhat in excess of that for last year this far in 1931.

Gas Oil

The market is still in soft position, with the posted price of 5¼ cents being freely shaded, and sales in tank car lots at refinery terminals reported all the way down to 4¼ cents. Contract withdrawals by the large gas manufacturing companies are holding up well, and sales of low-grade gas oil for domestic heating purposes are also well maintained.

Bringing in of several important natural gas producing wells in western New York State has again centered attention on the possibility of natural gas pipe lines to the metropolitan New York area. Local refiners are watching this situation closely, as the delivery of natural gas in this market would tend to considerably curtail sales of gas oil to the large utility companies here. It is not expected, however, that gas in its natural state would be marketed for domestic purposes in New York City, but that the natural product would be blended with the manufactured gas as an enriching element.

Petroleum Exports

Further declines in export shipments of refined petroleum products from the local port during the week ended February 28 developed, and with inquiry still limited by the weak appearance of the crude oil market, the outlook would appear to indicate a slow export trade in this territory for the nearby position.

The following table shows principal exports of refined petroleum products from New York for the past three weeks (all figures in gallons unless otherwise noted):

	Week ended		
	Feb. 28	Feb. 21	Feb. 14
Gasoline	.....	200,000	215,000
Naphtha	35,000	90,000	160,000
Kerosene	15,000	40,000	185,000
Fuel oil	160,000	.....	535,000
Lubricating oil	1,410,000	1,150,000	1,600,000
Petroleum, ref.	325,000	900,000	225,000
	Pounds		
Petrolatum	7,000	8,000	.....
Paraffin wax	1,450,000	1,070,000	345,000
Refined	360,000	140,000	.....
Scale	270,000	280,000	150,000
Lubricating grease	825,000	695,000	960,000

The downward reaction in domestic gasoline prices in the East this week has had its effect on the export situation, and has tended to further develop what many had believed to be an already overcautious attitude on the part of export operators. The gasoline decline, coupled with the continued evidences of weakness in lub oils and paraffin waxes, has been responsible for a further falling-off in buying interest during the period under review, and small lot trading, with immediate shipment on spot purchases, appears in sight for some time to come yet in this territory. Gasoline sales are suffering likewise from the strong competition afforded by Rumanian gasolines in European markets, which is tending to lower the world parity for motor fuel prices.

Export Market

While the large integrated companies with foreign marketing subsidiaries continue to move gasoline to these subsidiaries in fairly substantial quantities, the open market at the Gulf continues dull, with no inquiries reported.

According to cable from Europe this week, French buyers, who normally take a number of cargoes each month from the Gulf, have contracted for 300,000 tons of Rumanian gasoline for delivery up to June 30, this quantity covering practically their entire requirements for the first half of the year. With Rumanian gasoline selling at a price equivalent to slightly over 2 cents per gallon, f.o.b. Oklahoma refinery, Gulf sellers have found it impossible to meet this competition.

A survey completed by a large American company, however, would seem to indicate that Rumanian refiners will be forced to advance their quotations at mid-year current sales representing the liquidation of surplus stocks, which are being sold under cost of production.

Some inquiry for Venezuelan crude was reported this week, but no actual

business was reported in the open market due to the fact that no oil was offering. It is believed that a cargo will be available later in the month for April shipment, however. Last sales of Venezuelan crude were at 75 cents per barrel, tidewater.

Lower prices on Mid-Continent crude are expected to lead to a downward revision in Gulf gasoline and kerosene export quotations, and operators are hopeful of an early revival in foreign inquiry following such a reduction.

The California export market was quiet last week, but a cargo of 80,000 bbls. of U. S. Motor for shipment to the East Coast was being negotiated.

Imports

Imports of crude and refined petroleum at the principal United States ports for the week ended February 28 totaled 2,079,000 bbls., a daily average of 297,000 bbls., compared with 1,405,000 bbls., a daily average of 200,714 bbls. for the previous week and a daily average of 259,179 bbls. for the four weeks ended February 28. Details follow:

	Bbls. of 42 gals.
At Atlantic Coast ports—	
Baltimore	114,000
Boston	59,000
New York	1,257,000
Philadelphia	145,000
Others	364,000
Total	1,939,000
Daily average	277,000
At Gulf Coast ports—	
Galveston district	64,000
New Orleans and Baton Rouge	76,000
Total	140,000
Daily average	20,000
At Atlantic and Gulf Coast ports—	
Total	2,079,000
Daily average	297,000
Daily average four weeks	259,179

Distribution of total imports is as follows:

Crude	1,149,000
Gasoline	366,000
Fuel oil	564,000

California Oil Receipts

Receipts of California crude and refined petroleum at Atlantic and Gulf Coast ports for the week ended February 28 totaled 198,000 bbls., a daily average of 28,286 bbls., compared with 444,000 bbls., a daily average of 63,428 bbls. for the previous week, and a daily average of 43,821 bbls. for the four weeks ended February 28. Details follow:

	Bbls. of 42 gals.
At Atlantic Coast ports—	
New York	198,000
Total	198,000
Daily average	28,286
At Gulf Coast ports—	
All ports	None
At Atlantic and Gulf Coast ports—	
Total	198,000
Daily average	28,286
Daily average four weeks	43,821

All of the week's receipts consisted of gasoline.

Shipments of California refined products eastward during the week (with identity of owner of tanker moving the oil where such owner is an oil company) follow:

To New York—72,000 bbls. of gasoline on the Illinois (The Texas Company); and 81,100 bbls. of gasoline on the Agwiworld (Richfield).

To Port Arthur, Tex.—76,900 bbls. of Diesel oil on the Dungannon (The Texas Company).

Charter Market

No transatlantic trading in clean tanker tonnage was reported this week, and no inquiries were reported, say Funch, Edye & Co., Inc., in their current market summary. Rumanian shippers were again active in securing several vessels to the U.K./Continent for part cargoes at low rates. Generally, the report continues, the market is flat with rates which probably represent absolute low and further tonnage has been placed in laid-up position. Black oil charterers are open for May tonnage, Gulf/U.K., Continent, but are not pressing their inquiry. American coastwise and intercoastal trading was fairly active at low rates for clean and dirty tonnage.

Fixtures during the week were as follows:

American Steamer ———— (Mallory boat), creosote, New York, Jacksonville and Boca Grande, p.t., prompt.

Norwegian Motorship Norvinn, 10,000 tons deadweight, clean, part cargo 7,000 tons—10 per cent, Constanza to U.K.., 7/3, April.

Norwegian Motorship Peik, clean, part cargo 7,000 tons—10 per cent, Constanza to Humber and Antwerp, about 8/-, March.

Norwegian Motorship Glittre, 9,050 tons deadweight, clean, Black Sea to U. K./Continent, 7/6, March/April.

American Steamer ———— Kellogg, dirty, Gulf to North of Hatteras, 15 cents, March.

American Steamer D. J. Moran, 10,600 tons deadweight, dirty, Gulf to North of Hatteras, 14 cents, March.

Steamer ————, 50,000 bbls., clean, Gulf to North of Hatteras, 18 cents, March.

American Steamer J. W. Van Dyke, 6,865 tons deadweight, clean, Gulf to North of Hatteras, 16 cents, March.

AUTOMATIC PUMP STATIONS PROVE ECONOMICAL IN USE IN OKLAHOMA

By L. G. E. Bignell
Petroleum Engineering Editor

Men who have followed the industry of transporting oil through pipe lines for several years past seem to agree that more progress has been made in improved equipment and methods during the past four or five years than in any previous period of time.

There are a number of contributing factors to this progress but perhaps none is more outstanding than the adaptation of instruments and equipment developed in other industries for the control of pumping equipment in such a way as to reduce the cost of handling oil and also release men for more productive labor than tending machinery in a pump station.

One of the pioneer stations of the automatic controlled type was installed by the Deep Rock Oil Corp. at Drumright, Okla., in the Cushing Field, in December, 1928, and is known as its Wheeler automatic station. This was a steam pump station before it was converted to an automatic electric one and it is estimated that the cost of the new equipment was about $2,000 installed. This included Gaso pump with electric motor and Texrope drive and electric control apparatus, but does not take into account the cost of the 5,000-bbl. capacity work tank located at this station, for the tank would be necessary with any type station.

Prior to the conversion of this station from steam to electric driven the cost of operation was from $400 to $500 per month higher than the present costs would be if this station was operated to its full capacity of about 5,000 bbls. of oil daily. The cost of operating the electric station during 1930 was approximately $1.11 per 1,000 bbls. of oil pumped. The station has handled better than 50,000 bbls. of oil per month since its installation in 1928 and in 1930 it handled in excess of 60,000 bbls. per month. The costs in 1929 handling about 50,000 bbls. per month was about $1.40 per 1,000 bbls. pumped.

Liquid Level Control

In the station as originally changed the steam pumps and boilers were discarded and the electric driven Gaso pump with motor installed in a small building erected for this purpose. The motor is started and stopped by a Bristol liquid level control device that is actuated by the fluid level in the 5,000-bbl. receiving tank located near the pump.

It was decided that the control should shut down the pump when the fluid level within the tank was 2 feet above the bottom and the pump would again start when the oil in the tank stood at a depth of 3 feet 6 inches. Any depth of oil over 3 feet 6 inches will start the pump operating, so if it should be shut down because of electric power failure the pump would automatically start again when the power came on if the fluid level within the tank was deeper than 3 feet 6 inches. As the tank will hold more than two days' supply of oil for this pump it is hardly possible that the tank will be overflowed during a shutdown due to electric power line troubles.

Remote Control System Used

This liquid level control device is operated by the fluid level established in a 2-inch pipe system that runs from the 5,000-bbl. storage tank to the pumphouse. In this 2-inch pipe oil is always present and as the head varies in the tank the pressure at the pump end of this 2-inch line varies and this change in pressure at the liquid level control instrument actuates the flow of current to the motor. This fluid level control instrument was first used on water systems and with minor changes was adapted to the use of the oil pipe line requirements.

The 5,000-bbl. work tank at the Wheeler station is receiving oil from some 50 or 60 leases scattered throughout the Drumright Field, the oil being transported to the tank by the ordinary field gathering methods. From Wheeler Station to the Deep Rock refinery at Cushing, Okla., the oil is transported through a 4-inch pipe line. This system has an estimated maximum daily capacity of about 5,000 bbls. of oil, but at this time is being operated at less than half of its rated capacity.

Protective Relay System

After the Bristol liquid level control device had been installed and had been in operation for about three months it was decided to add a protective relay system that would take care of any change in line pressures beyond the pump either due to breaks in the line and a falling of pressure, or to clogging the line and increasing pressure. The normal working pressure of this system is about 110 pounds per square inch, and if this pressure is varied within a predetermined amount the protective relay system will become operate and the motor will be shut down and the pump stopped.

Since this additional improvement was made in March, 1929, there has never been any occasion for it to operate, as the line has never broken or become clogged, but it is regularly tested by opening by-pass valves and permitting the pressure to drop, or by closing gates along the line and causing the pressure to build up in the system. It has always worked satisfactorily during these tests.

The Wheeler station gave such good satisfaction that it was later decided to install another automatic pump station on the pipe line that is receiving oil from the leases in the Slick, Okla., Field and sending it on to the refinery at Cushing, Okla.

Practically the same type of equipment has been installed in this second station, except that the work tank is only 2,000-bbl. capacity and the line from the tank to the main line near Bristow, Okla., is 4-inch, while the line from Bristow to the refinery at Cushing is 6-inch diameter.

This system is operated by the field gauger in charge of the Slick district. He lives at the station and once a day changes the recording pressure gauge charts. This is the extent of his work at this station, and the balance of his time is spent in the field gauging lease tanks and putting them on the gathering lines. The district served by this gathering system extends from Tabor, Okla., at the north end of the Slick Field to Phillipsville, Okla., located west of Okmulgee.

This pump works at a line pressure of 125 pounds and is safeguarded by the protective relay system that will shut off the electric current if that pressure is decreased or increased over the predetermined limits.

In making this change the Deep Rock Oil Corp. found that they could reduce the cost of handling oil at this point from about $575 per month for labor, power and upkeep to about $75 or $80 per month for handling the same amount of oil. This present cost is largely in electric power, for the upkeep on the equipment is very slight. The field gauger is required to repack the pump as occasion demands and do any other minor repair job about the station but the time spent on such work since the station was put into operation has been negligible.

One of the advantages of this type of installation is the use of interchangeable liner-type power pump which permits the capacity of the station to be varied as conditions require by the simple process of changing the size of the liners and pistons within the pumps. It has not been necessary to make such changes frequently but if the demand for oil at the refinery varies, or the amount of oil that can be taken from the leases is changed by proration or other conditions, the pump capacity can be so adjusted that the station will handle the oil within a specified time.

The electric control system includes equipment that will shut down or start up the motors at the pumps at any predetermined time of the day or night and this in addition to the fluid level control permits of a number of combinations of handling conditions at the stations that can be varied to suit field or refinery requirements.

The designing and installing of these stations was largely supervised by J. A. Tubbs, assistant to the manager of the pipe line department of the Deep Rock Oil Corp., and the electrical installations made by the Petroleum Electric Co. of Tulsa.

Since these stations were installed the growth of the idea of automatic control for pump stations has been steady and the experimental station located at the Petroleum Exposition grounds at Tulsa contains apparatus for performing about every duty around a pump station that is necessary. The duties of the pump station attendant have been reduced to a minimum, but he is still necessary because repairs to machinery cannot be made without the aid of men skilled in this class of work and with all the improvements that have been made some parts of all equipment will still wear and deteriorate with use and therefore must be replaced.

The advantages and savings to be effected by the use of automatic equipment has been so thoroughly established that the expansion of its application is going on at a rapid rate and it is now impossible to predict what forms this type of installation will take in the future.

PERMIT POLICY TO COURT

WASHINGTON, D. C., Mar. 7.—President Hoover's oil conservation policy closing public oil and gas lands to prospecting, will be reviewed by the Supreme Court. Four cases assailing the policy, supported by the States of New Mexico, Montana, Wyoming, Utah and Colorado, will be considered by the highest court.

The five States complained that the effect of the closing of public lands to oil prospecting would materially lower their revenues by depriving them of a fruitful source of taxation.

The District of Columbia Supreme Court, where approximately 200 other similar cases are pending, decided in favor of the prospectors, but the Court of Appeals reversed that action and sustained the order.

S. J. JOHNSTON DIES

ATLANTA, Ga., Mar. 7—From a cable message received here, it was learned that Samuel J. Johnston, 54, who formerly was an official of the Standard Oil Co. here for nearly 10 years, died February 23, at Zagreb, Yugoslavia, where he had served for the past several years as auditor for the Standard Oil Co. Before going to Yugoslavia, Mr. Johnston was stationed several years in the Far East.

Brief Items for Petroleum Refiners

F. J. Wolfe Managing Director of the Anglo-American Oil Co., Ltd.

CHATHAM, Ontario, Mar. 7.—Frederick J. Wolfe of Toronto, for several years director and vice president in charge of marketing for Imperial Oil, Ltd., has been appointed managing director of the Anglo-American Oil Co. with head offices at London, England.

Frederick J. Wolfe

Mr. Wolfe will assume his new duties about March 15. He will have charge of all operations of the Anglo-American Oil Co., which markets petroleum and petroleum products throughout the United Kingdom, northern Ireland and the Irish Free State. The organization is one of the largest of its kind in the world, employing some 8,500 people, and operating 20 ocean-going tankers, 102 coasting ships, nearly 2,000 tank cars and 4,000 motor vehicles.

Mr. Wolfe's retirement from the Imperial directorate has been followed by the appointment of two new directors. John McNeil, formerly assistant general

(Continued on Page 150)

VENEZUELAN GASOLINE IMPORTED FOR MEXICO

Huasteca Petroleum Co., subsidiary of Pan American Petroleum & Transport Co., has recently imported at Tampico, Mexico, approximately 3,500,000 gallons of gasoline from its refinery in Venezuela, and is understood to be contemplating further large importations. Another large importation earlier in the year aroused criticism in the Mexican press. This criticism, however, was not directed at Huasteca, the comments being aimed at conditions which made importation more economical than manufacture at Mexican refineries.

President Ortiz Rubio of Mexico has received protests against this importation from organized refinery employes of Tampico. A petition was drawn up by the workers urging heavy tariffs against refined petroleum products.

A.S.T.M. COMMITTEES TO HOLD ANNUAL MEET

All of the committees and subcommittees which will participate in the annual spring meeting of groups in the American Society for Testing Materials, March 16, 17, 18, 19 and 20, at Pittsburgh, Pa., have been announced by the society. These sections will present reports on the fields they have covered for study and discussion. The regional meeting sponsored by the society will be held on March 18.

OIL MERGER ABANDONED

CHATHAM, Ontario, Mar. 7.—Announcement has been made that negotiations carried on for some time with regard to the merging of the McColl-Frontenac Oil Co. of Toronto and Montreal in the Cities Service Co. have been definitely abandoned.

U. S. IMPORTS IN PHILIPPINES

Decreased use of kerosene for lighting purposes will bring a decline in the importation of that commodity in the Philippine Islands, according to Trade Commissioner E. D. Hester, Manila. A drop in gasoline imports is also seen. The United States supplies 75 per cent of the crude oil, 70 per cent of the gasoline, 80 per cent of the kerosene and 90 per cent of the lubricating oil imported. The remainder is bought from Netherland East Indies companies.

MILWAUKEE CHECK SHOWS MORE TRACKAGE STATIONS

Total consumption of gasoline in the Greater Milwaukee market, according to the 1931 consumer analysis prepared by the Journal of that city, reached a record figure of 44,848,406 gallons in 1930, an increase of 2,829,095 gallons over 1929. Of the 35 brands of gasoline marketed, three accounted for more than 80 per cent of the sales. The average Milwaukee family bought 39.2 gallons of gasoline a month.

Proportionately, the increase in business by the trackage service stations was several times greater than that of any of the regular outlets. In 1929 the trackage stations were selling to 1,416 families, and in 1930 this number was increased to 4,004 families.

U. S. OIL EXPORTS CUT BY RUSSIA AND RUMANIA

Breakdown of production restrictions in Rumanian oil fields and increased marketing activities of the Soviet trust, have resulted in price declines which have made necessary heavy curtailments in shipments of American exporters. While the U. S. Motor refinery price stands at between 3¾ to 4¾ cents at Tulsa, Okla., the price at Port Constanza is the equivalent of 2 cents at Tulsa.

CHEMICAL SHOW MAY 4 TO 9

Plans have been completed for the thirteenth exposition of Chemical Industries at the Grand Central Palace, New York City, May 4 to 9. As refining turns from being the simple recovery of the gasoline from the crude oil by simple distillation to that of actually synthesizing motor fuels and lubricants by chemical means, those interested in modern refining and the future of refining practices have shown an increasing interest in the displays of equipment included at these shows. Impetus is being given to the chemistry of refining by the advent of hydrogenation and the need for gasolines of high antiknock value.

BRITISH CONTRACT TO SOVIETS

British Electrical Federation has awarded a contract for 20,000,000 gallons of gasoline, valued at about $4,000,000, to Russian Oil Products Co.

CRUDE PRICES GOVERN CANADIAN APPRAISALS

WASHINGTON, D. C., Mar. 7.—Collectors of customs in Canada have been instructed to appraise refined gasoline imported from the United States refining points in accordance with the following schedule, per wine gallon:

Pennsylvania, New York and district, which includes Atlantic Seaboard, 8.119; Toledo, Detroit, Cleveland, and district, 8.76; Chicago and district, 7.66; Minneapolis and district, 8.01; Wood River, St. Louis and district, 7.26; Mid-Continent district, which includes the States of Oklahoma, Kansas, part of Missouri, part of Arkansas, and North Texas, 5.51; south Texas, Louisiana and district, 7.06; Wyoming and district, 5.51; Montana and district, 8.51.

No imports of refined gasoline are to be entered at less than their invoice values, nor at less than the fair market value as sold for home consumption. The above prices are based on current prices of crude oil in different fields, and will be adjusted as crude prices change. The regular duty on refined gasoline is specific (2½ cents per imperial gallon), and is therefore not affected by these minimum values on gasoline. If invoiced gasoline is sold to Canada at lower values, however, dumping duty will be applied equal to the difference between the fixed values and such lower valuations.

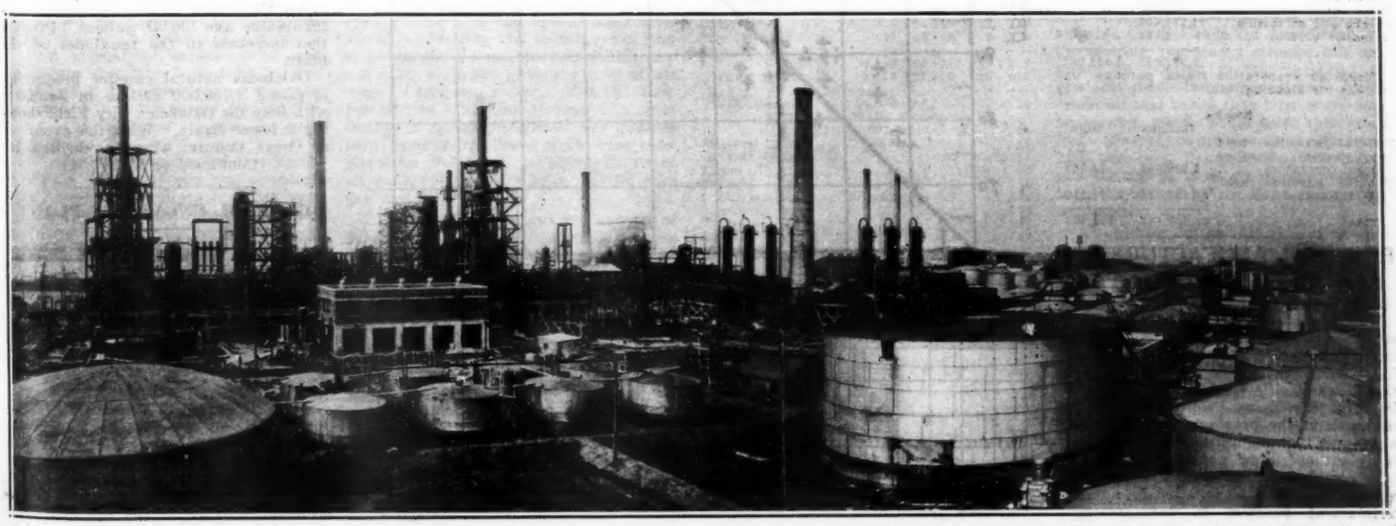
—C. E. K.

ORDER REDUCES RATES ON MID-CONTINENT PRODUCTS

Effective June 16, railroad rates to a number of Nebraska cities from Mid-Continent refineries will be reduced, in accordance with a recent order of the Interstate Commerce Commission. Reductions will range from 1 to 8 cents per 100 pounds on refined petroleum products, and the charges on crude oil will be 80 per cent of the rates on refined.

PLAN WAINWRIGHT PLANT

CHATHAM, Ontario, Mar. 7.—Stilson Products, Ltd., has been incorporated under Dominion charter to construct and operate a refinery in the Wainwright district, east central Alberta. The plant will utilize a process perfected by W. H. Stilson for extracting a distillate, gasoline and lubricants from the Wainwright heavy crudes.



Panoramic view showing status of construction work on Gulf Refining Co.'s new 12,000-bbl. refinery at Toledo, Ohio.

Manufacture of Natural Gasoline

Small Decrease in Plant Production On Western Coast

With 135 natural gasoline plants in operation, three less than in December, 1930, California's daily average production of natural gasoline dropped 1,890 bbls. in January. These plants have a daily indicated capacity of 2,583,500 cubic feet, and produced 64,165,282 gallons of natural gasoline from 44,291,998,000 cubic feet of gas in January.

A further decline, this time of 287,132 bbls., was noted in the figures for utilization of natural gasoline in December and January. Utilization in January amounted to 1,350,477 bbls., representing a decrease in daily average of 5,718 bbls.

Stocks of natural gasoline at the end of January amounted to 1,571,605 bbls., of which 52,588 bbls. were reported by natural gasoline plant operators, and 1,519,017 bbls. by refinery operators. This is an increase of 177,268 bbls. over December stocks. This stock figure of 1,571,605 bbls. is approximately 36 days' supply at the current rate of consumption.

CALIFORNIA NATURAL GASOLINE PRODUCTION, DISTRIBUTION AND STOCKS, JANUARY 1931

Production by Fields

	Gas treated (M.C.F.)	Natural gasoline produced (gallons)
Fullerton and Whittier	650,963	1,593,775
Midway	2,285,052	3,835,732
Huntington Beach	645,932	1,977,941
Kettleman Hills	12,941,868	10,257,954
Long Beach	7,000,172	13,661,906
Richfield	489,663	668,207
Santa Fe Springs	8,555,608	12,106,538
Seal Beach	958,366	1,485,976
Ventura Avenue	4,883,811	4,823,120
All other fields	5,830,533	7,754,113
Total	44,291,998	64,165,282

Production by Methods

Type of plant—	Gas treated (M.C.F.)	Natural gasoline produced (gallons)
Oil absorption	44,097,703	63,953,248
Compressor	194,295	212,034
Total	44,291,998	64,165,282

Finished gasoline at plants, 21,463 bbls.

Note—Combination plants have been reclassified as oil absorption.

Distribution

		Bbls.
Stocks first of month		1,394,337
Produced during month		1,527,745
Quantity mixed with crude or unfinished oils	Bbls. 69,401	
Used in blending at refineries	840,744	
Shipments	435,268	
Stocks end of month	1,571,605	
Balance*	4,964	
	2,922,082	2,922,082

*Includes evaporation losses, purchase by jobbers for blending, etc.

Stocks

	Gallons	Bbls.
Natural gasoline held by natural gasoline plant operators	2,208,689	52,588
Natural gasoline held by refineries	63,798,714	1,519,017
Total	66,007,403	1,571,605

RANGER MANUFACTURERS ANNOUNCE NEXT MEETING

Members of the Natural Gasoline Association of America in the Ranger district will hold their annual meeting March 31 at Thurber, Tex., in the clubhouse of the Texas Pacific Coal & Oil Co. Dean Hiatt of the Texas Pacific company is chairman of the program committee and announces that the schedule of events for the plant operators' gathering is practically completed. The morning and afternoon sessions will be followed by an entertainment program in the evening. More than 200 natural gasoline men are expected to attend.

LESS PROPANE IN FUEL INDICATED BY STUDY OF VAPOR LOCK FACTORS

By F. C. Burk
Automotive Engineer, Vacuum Oil Co., Paulsboro, N. J.

In order to study the problem of vapor locking from the standpoint of the refiner, a number of experimental trials were made using fuels of known characteristics and in cars having fuel carburetor systems of different designs. These cars were equipped with thermocouples located in the fuel system at important points. The need for complete stabilization of the motor fuel constituents, whether a blend of natural gasoline and refinery gasoline, or all refinery gasoline is shown in the data derived.

Looking at the vapor lock problem from the refiner's standpoint required pertinent data (then unavailable) as to fuel system temperatures in automotive equipment before any conclusion could be drawn to eliminate vapor lock. This made it necessary to obtain a representative group of cars which varied in fuel system designs and actually measure these temperatures.

Vapor locking data were obtained on gravity, fuel pump, and vacuum types of fuel systems by the insertion of calibrated thermocouples placed at strategic points and used in conjunction with a specially constructed direct reading millivoltmeter.

Fuels were prepared for use in these cars by blending casinghead gasoline with a fuel which would not lock, and varying the percentages of the former fuel with the latter until an approximate vapor locking temperature 40° F. above the atmospheric was obtained. The entire fuel system of the car was drained and this prepared fuel used for the test. The car was driven on the road at 40 miles per hour as maximum fuel system temperatures were found to occur at this speed. If the car would vapor lock it was immediately stopped and a sample removed from the fuel system. This sample was returned to the laboratory for a Reid vapor pressure determination. If the car did not lock after an approximate run of 20 to 30 miles, additional casinghead gasoline was added to the rear tank and so on until lock occurred. On the other hand, when the car did lock, the lower vapor pressure gasoline was added to the rear tank until the car would no longer lock. Reid vapor pressures at 100° F. were obtained on all samples removed from the fuel system at the point of vapor lock. Care was taken to secure samples representative of the fuel which was actually locking in the car. This point is mentioned as considerable weathering of the fuel takes place in the vacuum tank in vacuum types of systems and a rear tank sample would not represent the gasoline actually locking in the car.

From the data obtained it was determined that vapor lock occurred at the vacuum tank outlet for vacuum type of fuel feed systems, at the sediment bowl for gravity types of fuel systems, and in general at the pump inlet for fuel pump types of systems. These data were compared with predicted vapor locking temperatures obtained by the substitution of the Reid vapor pressure in relations previously found by the Bureau of Standards. The reduced equation for predicting vapor locking temperatures is:

$t = 259 - 140 \log p_r$ where

t = vapor locking temperature in °F.

p_r = Reid vapor pressure at 100° F.

The calculated vapor locking temperature by the use of the equation agrees very favorably with the observed vapor locking temperature in the case of the vacuum tank cars and is 4° to 5° F. lower for the gravity type of system. For the fuel pump systems the agreement between the observed and predicted temperatures is slightly variable, but on the

(Continued on Page 151)

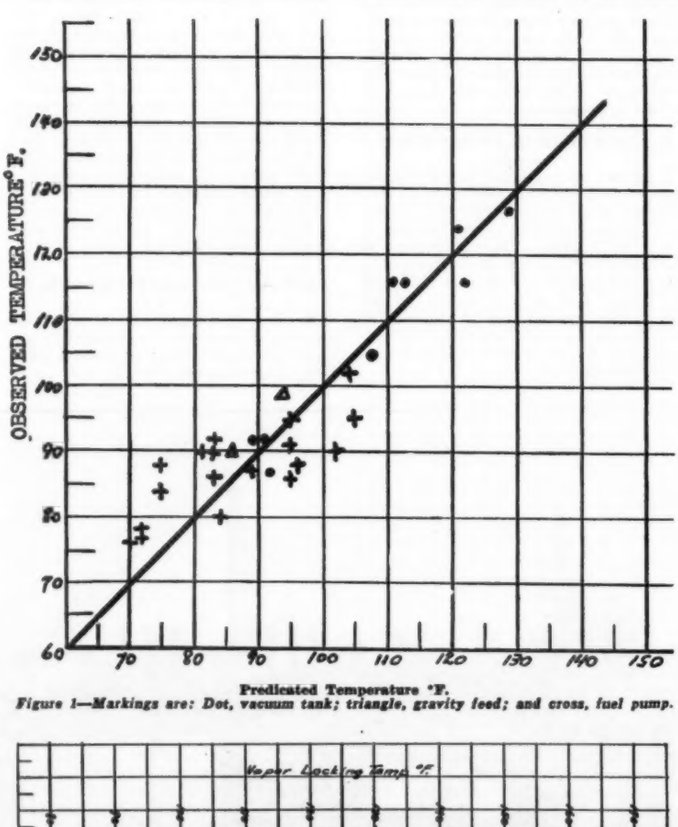


Figure 1—Markings are: Dot, vacuum tank; triangle, gravity feed; and cross, fuel pump.

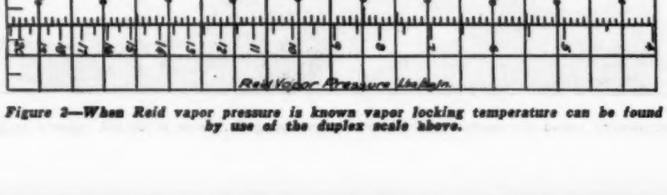


Figure 2—When Reid vapor pressure is known vapor locking temperature can be found by use of the duplex scale above.

LIQUEFIED GASES SHOW 1930 SALES INCREASES

The phenomenal growth of a new phase in the petroleum industry is brought out in a report just completed by the United States Bureau of Mines on the utilization of liquefied petroleum gases in the United States. The marketed production of these gases, principally propane and butane, for the years 1928, 1929 and 1930 is compared and it is shown that sales have been doubled in each successive year.

In 1930 the marketed production of fuels obtained by liquefaction of natural gasoline fractions which are too volatile for blending purposes reached a total of 18,017,347 gallons, representing an increase of 8,086,383 gallons over 1929, when 9,930,964 gallons were marketed. The 1930 marketed production surpassed that of 1928 by 13,494,448 gallons.

JANUARY DAILY OUTPUT IS 80,000 GALLONS LESS

Due principally to heavy declines in production in the two leading states, California and Texas, the daily average output of natural gasoline in the United States during January was 80,000 gallons less than that of the preceding month. While an increase was shown in the Kettleman Hills (California) production, a drop of 2,300,000 gallons in the Santa Fe Springs output, and an 800,000-gallon cut at Ventura Avenue, overshadowed the Kettleman Hills advance. Decrease for the State was 2,400,000 gallons.

In Texas the 2,100,000-gallon decline in January was accounted for mostly in the 2,300,000-gallon drop in production in the Panhandle. In West Central Texas the decline was 100,000 gallons. Production increased in the remainder of the State.

Oklahoma natural gasoline production increased 1,700,000 gallons in January, with only the Oklahoma City Field showing a lower figure. With the exception of Osage County, where production in-

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PURE OIL ENLARGING PLANT

The Pure Oil Co., which operates a 14-unit casinghead gasoline plant in the Van Field, is reported to be enlarging this plant to handle the increased supply of gas from the new wells in the field. The gasoline is being shipped out to the Gulf Coast, most of it going to the company's refinery at Smith's Bluff.

EXECUTIVE HONORED

Congratulations were offered by the numerous friends of F. C. Henderson, president of the Henderson Co., March 6, on the occasion of his seventy-third birthday. Mr. Henderson has long been associated with the oil business, especially in the natural gasoline branch.

Seek Hearing on Code This Month

A.P.I. Division of Marketing Names Committee to Arrange for Meeting With Federal Trade Commission

By C. O. Willson

CHICAGO, Mar. 7.—A surprisingly unanimous opinion that the National Code of Practices for Marketing Refined Petroleum Products should be continued with or without governmental sponsorship was voiced in the first public session of the recently created Division of Marketing of the American Petroleum Institute at its first midyear meeting here.

The open sessions on Wednesday morning and afternoon were brought to a close with a resolution unanimously adopted approving the action of the marketing committee and the institute's board of directors which on Monday and Tuesday inaugurated plans to do everything possible to continue the code of ethics which has been in effect approximately 1½ years. Full support was promised a special committee appointed by President E. B. Reeser which was announced at the start of the open session.

This committee consists of the following: Roy B. Jones, president of the Panhandle Refining Co., chairman; Henry M. Dawes, president of the Pure Oil Co.; L. L. Stephens, general counsel of the Standard Oil Co. (Indiana); E. S. Hall, counsel, Standard Oil Co. of New Jersey, and W. R. Boyd, Jr., executive vice president of the institute. All members of the committee have been active in code work from its inception in the oil industry. Mr. Jones was chairman of the general committee which drew up the code and is now a member of the interpretation committee and chairman of the regional committee for the southwestern states.

To Arrange for Hearing

This committee expects to arrange for a hearing before the Federal Trade Commission before the end of the month. As instructed by the board of directors, the committee will endeavor to get the commission to rescind its action of January 30 in which it withdrew its approval of all but three of the committee's 21 rules and rewrote two of the three. The enforcement has been suspended until April 8 and it is hoped the committee will be able to secure favorable action by that time. It is possible in connection with the proposed hearing with the Federal Trade Commission that the committee will seek a general rally of the marketing branch of the industry at Washington in support of the code.

Little Opposition

The expected opposition which had been predicted by several failed to develop at the open meetings held Wednesday morning and afternoon. The attitude of those present as expressed by one speaker was that "this is no time for dissension" as to the provisions of the code and that the industry should prepare "to present a united front" to save the code now effective.

E. G. Seubert, president of the Standard Oil Co. (Indiana) and vice president of the American Petroleum Institute, presided as chairman and opened the meeting with a statement outlining the development of the code in the petroleum industry including the Government's approval of all industrial codes as shown in official statements that have been issued from time to time. Mr. Seubert expressed his strong support of the present code and explained the plans to bring about its continuance.

Representatives of a large number of the major marketing companies and chairmen of regional and state code committees followed, voicing their approval of the code. Among those who spoke were Henry M. Dawes, Pure Oil Co.; W. T. Holliday, Standard Oil Co. of Ohio; H. T. Klein, The Texas Company; W. T. Atkins, Skelly Oil Co.; M. G. Eitelman, Barnsdall Refining Co.; C. F. Smith, National Refining Co.; Charles F. Meyer, Standard Oil Co. of New York; J. C. Van Eck, Shell-Union Oil Co.; Frank R. Coates, Cities Service Co.; H. D. Collier, Standard Oil Co. of California; C. G. Sheffield, Standard Oil Co. of New Jersey; L. S. Wescoat, Pure Oil Co.; H. A. Wilkinson, Standard Oil Co. of New York; E. P. Angus, Magnolia Petroleum Co.; Charles Sutherland, Nebraska Independent Oil Men's Association; Alfred Levine, Tennessee Oil Men's Association; John Motter, Kansas Oil Men's Association; Amos Ball, Standard Oil Co. (Indiana); George Allee, Missouri Oil Men's Association; H. H. Ragle, Michigan Independent Oil Men's Association, and Paul G. Blazer, Ashland Refining Co.

Roy B. Jones

All the speakers urged that every effort be made to continue the code with its present rules. It was conceded by several that the "code is not perfect" but in its present form it has been a constructive factor in marketing during a particularly troublesome period in the oil industry generally.

Several speakers expressed the hope that in the event it is impossible to secure a satisfactory code with the Federal Trade Commission's approval the industry itself should continue it. Mr. Holliday, who said that he had not been in favor of securing the commission's approval in the first place, declared the code can carry on without its sponsorship. "The code draws its authority from the consent of those governed by it," he said, "and the industry should not be stampeded in the event that the commission fails to continue its approval."

Mr. Holliday and others emphasized the benefit that has accrued to the industry from the code by bringing those engaged in marketing together for the discussion of mutual problems. It has tended to remove suspicion and minimize the importance of rumors in creating bad market conditions. "It has brought open price competition rather than a competition of rumors," Mr. Holliday said.

Reports of regional and state chairmen showed that the code has been growing in favor. Cases were cited in which strong opposition when the code was first made effective has been changed to support when the objectors realized the benefits resulting from its application.

Lease and Agency Agreements

Practically the only discordant note in the sessions Wednesday centered around the so-called "lease and agency agreements." This feature of marketing has been a bone of contention ever since the code was promulgated. Mr. Boyd explained that in the code committee meetings where the rules of the code were agreed upon and at the meeting of the board of directors where the code was finally approved, attempts were made to secure a rule relative to the lease and agency agreements. It was not possible at that time and has not been feasible since to secure a ruling which would receive the necessary support from important units of the industry.

In the event that the code is continued it is probable efforts will be made later to secure a definite ruling covering the application of the lease and agency agreements. It is contended by a number of large and small marketing organizations that these agreements constitute the only important objection in their territories and has kept many from signing the code.

The support of these agreements comes largely from several major marketing companies and the opposition from the smaller refining and jobbing interests. It has increased rapidly as a market factor during the past two years. The usual application is for a large marketing company to lease station properties from the owner and then by agreement make the owner its agent in the operation of the stations. The agreement usually provides that the agent handle the lessor's products exclusively. On the part of those making these agreements, it is contended they furnish a highly desirable method of operation because in making the station operator an agent it permits the lessor to control the station operations including the prices at which products are sold. This arrangement automatically assures, it is contended, that the station will be operated under practices approved by the code.

The opposition contends that the lease and agency agreement is being abused, being used as a subterfuge to carry on practices forbidden by other provisions of the code. It is claimed the lessor often furnishes station equipment, signs, etc., contrary to the spirit of rules applying to the giving away or loaning of equipment. Excessive rentals and wide margins are other evils pointed to.

Effect on Lubricants

The exclusive features relative to the sale of company products have brought opposition from marketers of nationally known brands of lubricating oils. Several of these companies have depended largely on independent jobbing interests to distribute their products and the lease and agency agreements are gradually restricting the number of these outlets. An informal meeting sponsored by a national marketer was held Tuesday at which this phase of the marketing was discussed but no action taken.

R. J. Alexander, secretary of the Pennsylvania Grade Crude Oil Association, at the meeting Wednesday stressed this situation in relation to the marketing of products made from Pennsylvania grade crude oil and asked that later some rule be adopted which would solve this problem. Several companies manufacturing 100 per cent Pennsylvania lubricating oils are among those whose business has been threatened by the lease and agency agreements.

A question often asked during the three-day meeting had to do with the reasons for the action of the Federal Trade Commission in withdrawing its approval of the code which it helped to formulate. In the absence of any official statement by the commission, no satisfactory answer could be given.

It is known that complaints have been filed with the commission from the time the code first became effective. These complaints have come principally from the smaller marketers who professed to believe the code had worked an unwarranted hardship on them. As summarized by one speaker, most of the complaints have "come from those who hope to benefit from conditions which would prevail if we had no code."

FEBRUARY COMPLETIONS AVERAGE LOWER IN INITIAL PRODUCTION

Smaller average wells were brought in in February than in January reports from all the divisions east of California show. In January the initial production of the oil wells completed was 1,612 bbls. per well, while the February crop of oil wells yielded an averge of 1,183 bbls. per well in initial production. The total decline in initial production was 230,106 bbls. Seventy-five fewer wells were completed in February, including 32 fewer oil wells, 59 fewer dry holes, but 16 more gas wells.

In new work there was an increase of 4 in rigs up and a decline of 61 in wells drilling, a net decline of 57.

SUMMARY OF ALL FIELDS

	Wells Completed			
	Comp.	Prod.	Dry	Gas
Eastern	180	490	37	76
Central Ohio	73	601	25	39
Lima	13	5	4	8
Indiana	16	168	4	6
Michigan	14	813	9	1
Kentucky	51	1,958	17	16
Illinois	8	7	5	1
Kansas	40	9,196	16	3
Oklahoma	106	267,210	32	19
North Central Texas	143	3,650	87	8
East Central Texas	42	120,235	9	1
East Texas	2	.....	1	1
West Texas	48	9,268	20	0
Texas Panhandle	28	7,767	5	7
Gulf Coast	94	18,853	42	5
Southwest Texas	72	6,050	34	10
North Louisiana	32	2,176	17	11
Arkansas	5	218	3	1
Mississippi	3	.....	5	3
Montana	6	15	3	2
Wyoming	3	950	0	0
Colorado	6	846	3	0
New Mexico	13	41,748	3	0
Total February	1,003	492,220	369	218
Total January	1,078	722,326	428	202
Difference	75	230,106	59	16

	Rigs and Wells Drilling		
	Rigs	Drlg.	Ttl.
Eastern	57	154	211
Central Ohio	35	89	124
Lima	4	21	25
Indiana	2	52	54
Michigan	67	97	164
Kentucky	9	157	166
Tennessee	0	17	17
Illinois	3	19	22
Missouri	0	2	2
Kansas	38	142	180
Oklahoma	86	365	451
North Central Texas	28	188	216
East Central Texas	11	73	84
East Texas	11	22	33
West Texas	20	118	138
Texas Panhandle	20	76	96
Gulf Coast	21	144	165
Southwest Texas	26	170	196
North Louisiana	19	67	86
Arkansas	10	44	54
Mississippi	7	20	27
Alabama	2	3	5
Montana	11	59	70
Wyoming	15	96	111
Colorado	13	75	88
New Mexico	11	51	62
Utah	0	20	20
Total February	526	2,841	2,867
Total January	523	2,402	2,924
Difference	4	61	57

REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement unless otherwise noted.

GASOLINE AND NAPHTHA

	Mar. 10		Mar. 3		Feb. 24	
OKLAHOMA (Group 3)—						
50-52 450 endpoint	.03⅝	.03¾	.03¾	.04⅛	.04	.04¼
56-58 450 endpoint	.03½	.03¾	.03¾	.04	.03⅞	.04
58-60 437 endpoint (U. S. Motor)	.03½	.04	.03¾	.04¾	.04	.04¾
60-62 437 endpoint	.03¾	.04	.04	.04¾	.04¼	.04¾
60-62 400 endpoint	.03⅞	.04½	.04	.04¾	.04¼	.05
64-66 375 endpoint	.04¼	.04½	.04⅜	.05	.04½	.05¼
68-70 360 endpoint	.04⅜	.05	.05	.05¼	.05	.05¼
64-66 437 endpoint (blend)	.03½	.03¾	.03¾	.04	.03¾	.04¼
NORTH TEXAS—						
50-52 450 endpoint	.03⅝	.03¾	.03¾	.04	.03⅞	.04
58-60 450 endpoint	.03½		.03⅝	.03¾	.03¾	.04
58-60 437 endpoint (U. S. Motor)	.03¾	.03⅝	.03¾	.04¼	.03⅞	.04¼
60-62 400 endpoint	.03⅞	.04¼	.04	.04¼	.04⅛	.04¼
64-66 390 endpoint	.03⅞	.04	.04	.04⅜	.04¼	.04½
64-66 375 endpoint	.04⅛	.04¼	.04¼	.04½	.04½	.04¾
68-70 360 endpoint	.04⅝	.05	.04¾	.05	.04⅞	.05¼
64-66 437 endpoint (blend)	.03½	.03¾	.03⅝	.03¾	.03¾	.04¼
***NORTH LOUISIANA—**						
58-60 437 endpoint (U. S. Motor)	.04	.04¼	.04¼	.04¾	.04⅜	.04¾
***ARKANSAS—**						
58-60 437 endpoint (U. S. Motor)	.04	.04¼	.04¼	.04⅝	.04¼	.04¾
PENNSYLVANIA—						
52-54 Naphtha	.05⅜		.05¾		.06	
54-56 Naphtha	.05¾		.05¾		.06	
58-60 Gasoline	.05¾		.05¾		.06	
60 Gasoline	.06		.05¾		.06	.06¼
62 Gasoline	.06		.06		.06¼	
64 Gasoline	.06¼	.06½	.06¼	.06½	.06¼	.06¾
68-70 350 endpoint gasoline	.07		.07¼		.07¼	
CALIFORNIA—						
†54-58 437 endpoint (U. S. Motor) domestic	.05	.06	.05½	.06½	.08½	.10¼
†58-62 400 endpoint domestic gasoline	.07	.09	.08	.09½	.09	.10½
CHICAGO DISTRICT (Based on Group 3)—						
50-52 450 endpoint (Naphtha)	.03⅝	.03¾	.03¾	.04	.03⅞	.04
56-58 450 endpoint	.03½	.04	.03⅝	.03⅞	.03⅞	.04
58-60 437 endpoint (U. S. Motor)	.03⅝	.04¼	.03¾	.04⅛	.03⅞	.04¼
60-62 400 endpoint	.03¾	.04¼	.04	.04¼	.04⅛	.04⅜
64-66 375 endpoint	.04⅜	.04¾	.04¼	.04½	.04½	.04⅝
64-66 437 endpoint (blend)	.03½	.04	.03¾		.03¾	.04
68-70 360 endpoint	.04¼	.05¼	.04¾	.05	.04⅞	.05¼
GULF COAST (Export)—						
58-60 U. S. Motor	.04½	.05	.04½	.05	.05¼	
60-62 400 endpoint	.04¾	.05	.04¾	.05¼	.05½	
61-63 390 endpoint	.05⅝		.05⅝		.05⅞	
64-66 375 endpoint	.05⅞	.06	.05⅞	.06	.06⅛	.06¼

*Louisiana, Arkansas, Mississippi and East Texas delivery. †For local consumption.

NATURAL GASOLINE

	Mar. 10		Mar. 3		Feb. 24	
OKLAHOMA (Group 3)—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.03¼	.03⅜	.03¼	.03½	.03½	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.03		.03		.03¼	
Grade B, 76-83.9, 375 e.p., rec. 85%	.02½		.02⅝	.02¾	.02¾	
Grade BB, 84-92, 375 e.p., rec. 85%	.02½		.02½		.02¾	
Grade C, 80-92, 375 e.p., rec. 78%	.02½		.02½		.02¾	
NORTH TEXAS—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.03¼		.03¼	.03½	.03½	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.03		.03		.03¼	
Grade B, 76-83.9, 375 e.p., rec. 85%	.02½		.02½		.02¾	
Grade BB, 84-92, 375 e.p., rec. 85%	.02½		.02½		.02¾	
Grade C, 80-92, 375 e.p., rec. 78%	.02½		.02½		.02¾	
NORTH LOUISIANA—						
Grade AA, 80-87, 375 e.p., rec. 90%	.03¼		.03¼	.03½	.03½	
Grade BB, 84-92, 375 e.p., rec. 85%	.02½		.02⅝		.03	
Grade C, 80-92, 375 e.p., rec. 78%	.02½		.02½		.03	
CALIFORNIA—						
75-78 375-390 endpoint	.04½	.05½	.05	.06	.05	.06
CHICAGO DISTRICT (Based on Group 3)—						
Grade A, 72-79.9, 375 e.p., rec. 90%	.03¼		.03¼		.03½	
Grade AA, 80-87.9, 375 e.p., rec. 90%	.03		.03		.03¼	
Grade BB, 84-92, 375 e.p., rec. 85%	.02½		.02½		.02¾	

BURNING OIL

	Mar. 10		Mar. 3		Feb. 24	
OKLAHOMA (Group 3)—						
41-43 water white kerosene	.02¾	.03	.02⅞	.03	.03	.03¼
42-44 water white kerosene	.03	.03¼	.03¼		.03¼	.03½
NORTH TEXAS—						
41-43 water white kerosene	.02½	.03	.02¾	.03	.02⅞	.03
40-41 water white kerosene	.02⅝	.02¾	.02⅝	.02¾	.02¾	.03
***NORTH LOUISIANA—**						
41-43 water white kerosene	.03⅛	.03½	.03¼	.03¾	.03½	.04
***ARKANSAS—**						
41-43 water white kerosene	.03⅛	.03½	.03¼	.03¾	.03½	.04
PENNSYLVANIA—						
43 Kerosene prime white	.04¾		.04¾		.04⅞	
45 Kerosene water white	.04¾	.04⅞	.04¾	.04⅞	.04⅞	.05
46 Kerosene water white	.05		.05	.05¼	.05	.05¼
CALIFORNIA—						
38-40 water white Kero. (high burning test)	.04¾	.06	.04¾	.06	.04¾	.06
CHICAGO DISTRICT (Based on Group 3)—						
41-43 water white kerosene	.02⅞	.03⅛	.02⅞	.03	.02⅞	.03
42-44 water white kerosene	.03	.03¼	.03¼		.03¼	.03½
GULF COAST (Export)—						
41-43 prime white	.04¼		.04¼		.04¼	
44 water white	.05¼		.05¼		.05¼	

*Louisiana, Arkansas, Mississippi and East Texas delivery.

FUEL OIL

	Mar. 10		Mar. 3		Feb. 24	
***OKLAHOMA (Group 3)—**						
Below 18 gravity Fuel Oil, per bbl.	.40	.45	.40	.45	.40	.45
18-22 Fuel Oil, per bbl.	.42½	.50	.42½	.50	.42½	.50
20-22 Fuel Oil, per bbl.	.45	.55	.45	.55	.45	.55
22-26 Fuel Oil, per bbl.	.50	.60	.50	.60	.50	.60
24-26 Fuel Oil, per bbl.	.57½	.65	.57½	.65	.57½	.65
26-30 Fuel Oil, per bbl.	.65	.70	.65	.70	.65	.70
28-30 Fuel Oil, per bbl.	.75	.85	.75	.85	.75	.85
32-36 Gas Oil (industrial)	.01¾	.02	.01¾	.02	.02	.02⅛
32-36 Gas Oil (straw color, high cold test)	.01⅞	.02	.01⅞	.02	.02	.02⅛
32-36 Gas Oil (straw color, low cold test)	.02⅜	.02½	.02⅜	.02½	.02⅜	.02½
36-38 Distillate	.02¼	.02½	.02¼	.02½	.02½	.02⅝
38-40 Straw Distillate	.02½	.02⅞	.02½	.02⅞	.02⅝	.03

*Prices on fuel oil above 40 cold test usually from 5 to 10 cents under general quotations.

NORTH TEXAS—						
Below 20 gravity Fuel Oil, per bbl.	.30	.35	.30	.35	.30	.35
24-26 Fuel Oil, per bbl.	.45	.50	.45	.50	.45	.50
32-36 Gas Oil (industrial)	.01¾	.02	.01¾	.02	.01⅞	.02
38-40 Straw Distillate	.02⅜	.02¾	.02⅝	.02¾	.02½	.02¾
***NORTH LOUISIANA—**						
18-20 Fuel Oil, per bbl.	.70	.75	.70	.75	.70	.75
30-32 Gas Oil (low cold test)	.02⅝	.02¾	.02⅝	.02¾	.02⅞	.03
***ARKANSAS—**						
33-36 Distillate	.02¾	.03	.02¾	.03	.02¾	.03
30-32 Gas Oil	.02¼	.02⅝	.02¼	.02⅝	.02½	.02¾
16-22 Refinery Fuel Oil, per bbl.	.60	.65	.60	.65	.60	.65
GULF COAST (South Texas)—						
Gas Oil	.03⅛	.03¼	.03⅛	.03¼	.03⅛	.03¼
Bunker C Fuel (cargo lots), per bbl.	.65	.70	.65	.70	.65	.70
Bunker C Fuel (small lots)	.90		.90		.90	
PENNSYLVANIA—						
30-34 Fuel Oil	.03⅛		.03⅛		.03⅛	
36-40 Fuel Oil	.03¼		.03¼		.03¼	
CALIFORNIA—						
33-36 Distillate	.02	.02½	.02	.02½	.02	.02½
26-32 Distillate	.01¾	.02	.01¾	.02	.01¾	.02
15-19 Fuel Oil, Bunker (at tidewater), bbl.	.55	.90	.60	.90	.55	.90
15-19 Fuel Oil (cargo lots, at tidewater), bbl	.55	.80	.55	.80	.50	.80
†15-19 Fuel Oil, f.o.b. tank cars	.25	.70	.35	.75	.25	.70
27 plus Diesel, per bbl.	.75	1.00	.80	1.05	.80	1.05
30-34 Gas Oil	.80	1.10	.85	1.15	.85	1.05
CHICAGO DISTRICT (Based on Group 3)—						
18-22 Fuel Oil, per bbl.	.42½	.50	.45	.55	.45	.55
22-26 Fuel Oil, per bbl.	.50	.55	.55	.60	.55	.60
28-30 Fuel Oil, per bbl. (zero)	.75	.85	.80	.85	.80	.85
32-36 Gas Oil (industrial)	.01¾	.02	.01¾	.02	.01⅞	.02
32-36 Gas Oil (zero)	.02⅜	.02½	.02⅜	.02½	.02⅜	.02½
38-40 Straw Distillate	.02½	.02¾	.02⅝		.02¾	.03

*Louisiana, Arkansas, Mississippi and East Texas delivery. †Lowest priced fuel oil has high sulphur content.

LUBRICATING OIL AND WAX

	Mar. 10		Mar. 3		Feb. 24	
OKLAHOMA (Group 3)—						
100 vis., 2 color, 20-25 cold test	.05	.05½	.05	.05½	.05	.05½
100 vis., 3 color, 20-25 cold test	.04¾	.05	.04¾	.05	.04¾	.05
150 vis., 3 color, 20-25 cold test	.07		.07		.07	
150 vis., 4 color, 20-25 cold test	.06½		.06½		.06½	
180 vis., 3 color, 23-28 cold test	.08½		.08½		.08½	
180 vis., 4 color, 23-28 cold test	.08		.08		.08	
180 vis., 5 color, 23-28 cold test	.07¼	.07½	.07¼	.07½	.07¼	.07½
200 vis., 3 color, 23-28 cold test	.09¾	.10	.09¾	.10	.09¾	.10
200 vis., 4 color, 23-28 cold test	.09½		.09½		.09½	
200 vis., 5 color, 23-28 cold test	.09		.09		.09	
240 vis., 3 color, 25-30 cold test	.13¼	.13½	.13¼	.13½	.13¼	.13½
240 vis., 4 color, 25-30 cold test	.12¼	.12½	.12¼	.12½	.12¼	.12½
240 vis., 5 color, 25-30 cold test	.11¼	.11½	.11¼	.11½	.11¼	.11½
280 vis., 3 color, 25-30 cold test	.15½		.15½		.15½	
280 vis., 4 color, 25-30 cold test	.14½		.14½		.14½	
280 vis., 5 color, 25-30 cold test	.13½		.13½		.13½	
Cylinder Stocks:						
600, steam refined, light green	.06	.07	.06	.07	.06	.07
600, steam refined, dark green	.04½	.05½	.04½	.05½	.04½	.05½
190-200 vis., D color, Bright Stocks	.25		.25		.25	
150-160 vis., D color, Bright Stocks 0-10 c.t.	.18	.19	.18	.19	.18	.19
150-160 vis., D color, Bright Stocks 10-25 c.t.	.17	.18	.17	.18	.17	.18
150-160 vis., D color, Bright Stocks 25-40 c.t.	.16½	.17½	.16½	.17½	.16½	.17½
150-160 vis., E color, Bright Stocks	.17	.18	.17	.18	.17	.18
Waxes:						
124-126 White Crude Scale Wax	.02	.02⅛	.02	.02⅛	.02	.02⅛

All bright stock prices are for domestic movement.

PENNSYLVANIA—						
34 Neutral	.05½	.06	.05½	.06	.05½	.06
34 Sundebloom	.05½		.05½		.05½	
36 Miners' Neutral	.05½		.05	.05½	.05	.05½
150, 3 color	.15½	.16½	.14	.16	.14	.16
180, 3 color	.18½	.19½	.16	.17	.16	.17
200, 3 color	.20	.21	.18½	.19	.18½	.19
220, 3 color	.25	.26	.23	.24	.23	.24
600, steam refined	.08¼	.08½	.08½	.09	.08½	.09
650, steam refined	.12		.12	.13	.12	.13
600, Pennsylvania Flash	.13		.13	.14	.13	.14
630, Pennsylvania Flash	.18½	.19½	.18½	.19½	.19	.20
600, E filtered	.12		.12		.12	
600, D filtered, Oil City	.17		.17	.18	.17	.18
Pennsylvania Bright Stocks below 35 C.T.	.18		.18	.19	.18	.19
Pennsylvania Bright Stocks above 35 C.T.	.17		.17		.17	
*122-124 White Crude Scale Wax	.02¼		.02¼		.02¾	
124-126 White Crude Scale Wax	.02¼		.02¼		.02⅝	

*At New York.

GULF COAST (South Texas)—						
100 vis., 2-2½ color, pale oil	.06	.06¼	.06	.06¼	.06	.06¼
200 vis., 3 color, pale oil	.08¼	.08½	.08¼	.08½	.08¼	.08½
300 vis., 3 color, pale oil	.09½	.09¾	.09½	.09¾	.09½	.09¾
500 vis., 3½ color, pale oil	.10¾	.11	.10¾	.11	.10¾	.11
750 vis., 3½ color, pale oil	.12¼	.12½	.12¼	.12½	.12¼	.12½
1,200 vis., 3½ color, pale oil	.14¾	.15	.14¾	.15	.14¾	.15
2,000 vis., 4 color, pale oil	.15¾	.16	.15¾	.16	.15¾	.16
200 vis., 5-6 color, red oil	.07¼	.07¾	.07½	.07¾	.07½	.07¾
300 vis., 5-6 color, red oil	.08¾	.09	.08¾	.09	.08¾	.09

REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement unless otherwise noted.

500 vis., 5-6 color, red oil	.10	.10¼	.10	.10¼	.10	.10¼
750 vis., 5-6 color, red oil	.11	.11¾	.11	.11¾	.11½	.11¾
1,200 vis., 5-6 color, red oil	.13¾	.14	.13¾	.14	.13¾	.14
2,000 vis., 6 plus color	.15¾	.16	.15¾	.16	.15¾	.16
CALIFORNIA—						
130 vis., 2½-3 color	.09	.09½	.09	.09½	.09	.09½
200 vis., 2½-3 color	.10	.10¾	.10	.10¾	.10	.10¾
300 vis., 3-3½ color	.10¾	.11½	.10¾	.11½	.10¾	.11½
350 vis., 3½-4 color	.11½	.11¾	.11½	.11¾	.11½	.11¾
400 vis., 3½-4 color	.12¼	.12¾	.12¼	.12¾	.12¼	.12¾
Red Neutral:						
200 vis., 4½-5 color	.09½	.10	.09½	.10	.09½	.10
300 vis., 5-6 color	.10¼	.10¾	.10¼	.10¾	.10¼	.10¾
400 vis., 5-6 color	.11	.12	.11	.12	.11	.12
500 vis., 4½-5 color	.12¼	.13	.12¼	.13	.12¼	.13
500 vis., 5-6½ color	.12	.12¾	.12	.12¾	.12	.12¾
600 vis., 6½ plus color	.13	.14	.13	.14	.13	.14

Note—Bright stocks are not manufactured commercially on the Pacific Coast.

NEW YORK (BAYONNE) REFINERY PRICES

	Mar. 10		Mar. 3		Feb. 24	
Gasoline, U. S. Motor, 58-60, 437 e.p.	.06¾	.07½	.07½	.08	.07½	.08
Kerosene, water white, 41-43	.06¼	.06½	.06¼	.06½	.06¼	.06½
*Fuel Oil, Bunker "C," 41-43	1.05		1.05		1.05	
†Fuel Oil, Diesel, 28-30, per bbl.	1.85		1.85		1.85	
Gas Oil, 28 gravity plus	.04¼	.05¼	.04¼	.05¼	.04¼	.05¼
25 pale Paraffin Oil, tank car	.10¼		.10¼		.10¼	
28 pale Paraffin Oil, tank car	.07¼		.07¼		.07¼	
280 red Paraffin Oil, tank car	.12½		.12½		.12½	
250 red Paraffin Oil, tank car	.11½		.11½		.11½	
225 red Paraffin Oil, tank car	.10		.10		.10	
200 red Paraffin Oil, tank car	.09¼		.09¼		.09¼	
Domestic heating oil, min. 32 grav., tank car	.04½		.04½		.04½	
Refined Wax:						
120-122 a.m.p., per lb.	.03		.03		.03⅛	
125-127 a.m.p., per lb.	.03⅜		.03⅜		.03½	
130-132 a.m.p., per lb.	.03⅝		.03⅝		.03¾	
133-135 a.m.p., per lb.	.04⅜		.04⅜		.04⅜	
135-137 a.m.p., per lb.	.04¾		.04¾		.04¾	
Petrolatum in barrels in carload lots, per pound:						
Dark Green	.01¾		.01¾		.01¾	
Amber	.03		.03		.03¼	
Extra Amber	.03¼		.03¼		.03⅜	
Cream	.06		.06		.06	
Lily White	.06¾		.06¾		.06¾	
Snow White	.08		.08		.08	

*Lighterage 5 cents a barrel extra. †Lighterage 6.5 cents a barrel.

NEW YORK (BAYONNE) EXPORT PRICES

	Mar. 10	Mar. 3	Feb. 24
600, steam refined cylinder stocks, in bbls.	.16¾	.16¾	.16¾
635, steam refined	.17½	.17½	.17½
650, steam refined	.20½	.20½	.20½
600, Pennsylvania Flash	.21	.21	.21
630, Pennsylvania Flash	.28	.28	.28
600, Warren E	.22	.22	.22
600, Oil City E	.21	.21	.21
Light 140-150 Bright Stocks	.25½ .26	.25½ .26	.25½ .26
Dark 140-150 Bright Stocks	.23½ .24	.23½ .24	.23½ .24

LOS ANGELES EXPORT PRICES

	Mar. 10	Mar. 3	Feb. 24
Kerosene, water white	.04¾ .06	.04¾ .06	.04¾ .06
*U. S. Motor Gasoline, 53-55, 437 e.p.	.04¾ .06¾	.04¾ .06¾	.04¾ .07
*60-62, 400 endpoint gasoline	.05¾ .07½	.05¾ .07½	.06 .08

*For coastwise shipment.

CRUDE OIL PRICES

OKLAHOMA, KANSAS, NORTH AND EAST CENTRAL TEXAS

Rusk County, Tex.* (Feb. 10, 1931)...$ .40
Corsicana heavy (March 10, 1931)† ..... .45
Other fields.....See gravity table

*Posted by Panola Pipe Line Co. †Magnolia Petroleum Co.

TEXAS PANHANDLE

Gray County, Wheeler County and Carson-Hutchinson Counties.....See gravity table

WEST TEXAS

Iatan*.....Same as North Texas
Crane-Upton-Crockett, Howard and Glasscock and Ector (Mar. 10, 1931)†....$ .35
Winkler and Pecos, Tex., and Lea County, N. Mex. (Mar. 10, 1931)†..... .40

*Includes Westbrook Field. †Posted by Humble Oil & Refining Co.

ARKANSAS-NORTH LOUISIANA

Smackover (all grades) (Mar. 10, 1931).$ .45
Carterville, Sarepta and Cotton Valley, below 36 gravity.....See gravity table
March 10, 1931 ..... .45
Urania (Oct. 30, 1930)..... .75
Calion, heavy (March 10, 1931) ..... .45
East El Dorado (March 10, 1931) ..... .45
Other fields.....See gravity table

Note—Smackover and Bellevue posted by Standard Oil Co. of Louisiana and Magnolia Petroleum Co.; Urania posted by Louisiana Oil Refining Corp.; East El Dorado posted by Gulf Refining Co. and Magnolia Petroleum Co.; Calion posted by Gulf Refining Co.

GULF COAST

Grade A (Jan. 14)*.....$ .80
Grade B, 25° and upward. See gravity table
Jennings, La. (Oct. 30, 1930)†..... .80
Refugio (light).....Same as Grade B
Refugio (heavy) (Jan. 14)*..... .69
Markham (Mar. 10, 1931)‡..... .50
High Island (Oct. 30, 1930)†..... .75

*Humble Oil & Refining Co. †Gulf Refining Co. of Louisiana. ‡Texas Pipe Line Co.

ROCKY MOUNTAIN STATES

Ohio Oil Co.-Midwest Refining Co.

Iles (Feb. 15, 1930):
33 gravity and above.....$ .87
Under 33 gravity..... .65
Dutton Creek (Oct. 28, 1930)..... 1.01
Rock Creek, Wyo. (Mar. 5, 1931)..... .66
Salt Creek.....See gravity table
Big Muddy (Mar. 5, 1931)..... .65
Grass Creek, heavy (July 27, 1928).... .90
Grass Creek, light (Mar. 5, 1931)..... .90
Mule Creek (May 21, 1929)..... 1.20
Elk Basin (Mar. 5, 1931)..... .90
Lance Creek (Mar. 5, 1931)..... .98
Poison Spider (Mar. 14, 1927)..... 1.00
Notches (Mar. 14, 1927)..... .65
Dallas-Derby (Jan. 1, 1931)..... .70
Hudson (Jan. 1, 1931)..... .75
Rex Lake (Feb. 22, 1930)..... 1.10
Osage (Nov. 1, 1930)..... .85
Lost Soldier (Mar. 6, 1931)..... .55
Hamilton Dome (Mar. 14, 1927)..... .85
Greybull (Oct. 28, 1930)..... 1.25
Torchlight (Oct. 28, 1930)..... 1.25
Cat Creek (Oct. 28, 1930)..... 1.25
Pondera (Mont.) (Oct. 28, 1930)..... 1.45
Sunburst (Mont.) (Oct. 28, 1930)..... 1.55
Hogback (N. Mex.) (Oct. 28, 1930).... 1.40
Artesia (N. Mex.) (Oct. 28, 1930)..... .75
Lea County ..... .40
Border, Mont. 1.55
Red Coulee, Alberta 1.55

Note—Salt Creek, Osage, Cat Creek, Dallas-Derby, Hudson, Greybull and Hogback posted by Midwest Refining Co. and the remainder by the Ohio Oil Co. Both companies posted Grass Creek light and Elk Basin. Lost Soldier posted by Producers & Refiners Corp. Artesia posted by Ohio Oil Co. and Continental Oil Co. Latter company posted 50 cents per barrel January 1, 1931. Border and Red Coulee posted by Imperial Refining Co. Ohio Oil Co. ceased posting Artesia on March 5, 1931.

SOUTH CENTRAL AND SOUTHWEST TEXAS

Darst Creek (Mar. 10, 1931)*.....$ .60
Luling (Mar. 10, 1931)† ..... .45
Mirando (Jan. 14)*..... .69
Pettus (Mar. 10, 1931)*..... .95
Salt Flat (Mar. 10, 1931)*..... .60
Thrall‡ .....
Lytton Springs (Lockhart) See gravity table
Dobrowolski (Oct. 25, 1930)‡.....
Same as Mid-Continent gravity scale up to and including 38-38.9° at..... 1.01

(Continued on Page 143)

CRUDE OIL GRAVITY TABLE

Gravity—	1 Kansas, Oklahoma, North Central, East Central Texas	2 North Louisiana-Arkansas	3 Carson and Hutchinson (Texas Panhandle)	4 Gray County (Texas Panhandle)	5 Salt Creek, Wyoming	6 Stephens, Arkansas	7 Grade B, Gulf Coast
Below 25	....	....	....	....	....	....	$.69
25 to 25.9	....	....	....	....	....	....	.71
26 to 26.9	....	....	....	....	....	....	.73
27 to 27.9	....	....	....	....	....	....	.75
28 to 28.9	....	....	....	....	....	....	.77
Below 29	$.43	$.43	....	....	....	$.54	....
29 to 29.9	.45	.45	....	....	$.69	.58	.79
30 to 30.9	.47	.47	....	....	.73	.62	.81
31 to 31.9	.49	.49	....	....	.77	.66	.83
32 to 32.9	.51	.51	....	....	.81	.70	.85
33 to 33.9	.53	.53	....	....	.85	....	.87
34 to 34.9	.55	.55	$.38	$.43	.89	....	.89
35 to 35.9	.57	.57	.40	.45	.92	....	.91
36 to 36.9	.59	.59	.42	.47	.95	....	.93
37 to 37.9	.61	.61	.44	.49	.98	....	.95
38 to 38.9	.63	.63	.46	.51	....	....	.97
39 to 39.9	.65	.65	.48	.53	....	....	.99
40 and above	.67	.67	.50	.55	....	....	1.01

Column 1—Stanolind Crude Oil Purchasing Co. posted above prices on March 5, effective in Kansas, Oklahoma, North Texas, Central Texas and East Central Texas, where it purchases oil. Magnolia Petroleum Co. posted same day but with these differences: Below 26 degrees, 40 cents; 26-26.9 degrees, 41 cents; 27-27.9 degrees, 42 cents; 28-28.9 degrees, 43 cents. Mid-Continent Petroleum Co., Tidal Oil Co., Tidal Western Oil Co., Continental Oil Co., H. F. Wilcox Oil & Gas Co., Eason Oil Co., Standard Oil Co. of Kansas, Sinclair Refining Co., White Eagle Oil Corp., and Producers Oil Co. met the price on March 6, Champlin Refining Co. on March 7, Carter Oil Co., The Texas Company, Humble Oil & Refining Co., Empire Pipe Line Co., Gypsy Oil Co., and Gulf Pipe Line Co. met Stanolind prices on March 10.

Column 2—Standard Oil Co. of Louisiana and The Texas Company posted on March 10. Standard prices apply to Caddo, Homer, Haynesville, Bull Bayou, Sabine, Crichton, DeSoto, El Dorado, Cotton Valley, Sarepta and Carterville.

Column 3—Posted by Humble Oil & Refining Co., March 10. Adopted by other buyers same day.

Column 4—Posted by Humble Oil & Refining Co., March 10. Adopted by other buyers same day.

Column 5—Posted by Midwest Refining Co., October 28, 1930. All crude above 37.9 degrees 98 cents.

Column 6—Posted by Louisiana Oil Refining Co. and Atlantic Oil Producing Co., October 30, 1930.

Column 7—Posted by Humble Oil & Refining Co., January 14, 1931, meeting Gulf Refining Co.'s price schedule posted October 30, 1930.

UNION OIL CO. OF CALIFORNIA

Current Prices for Crude Oil at the Well Effective 7 a.m. March 10, 1931

Gravity—	1 Santa Fe Springs	2 Alamitos Hts., Signal Hill, Seal Beach, Torrance, Athens, Rosecrans, Dominguez	3 Montebello, Huntington Beach, East Coyote, Richfield, Brea-Olinda	4 *Playa Del Rey	5 Santa Paula	6 Orcutt	7 Coalinga, McKittrick, Kern River, Sunset-Midway, Elk Hills, Buena Vista Hills, Lost Hills	8 Kettleman Hills
11 to 13.9°	....	....	....	....	....	....	$.50	....
14 to 14.9	....	$.65	$.65	....	$.65	$.55	.55	....
15 to 15.9	....	.65	.65	....	.65	.55	.55	....
16 to 16.9	....	.65	.65	....	.65	.55	.55	....
17 to 17.9	....	.65	.65	....	.65	.55	.55	....
18 to 18.9	....	.65	.65	....	.65	.55	.55	....
19 to 19.9	$.65	.65	.65	....	.65	.55	.55	....
20 to 20.9	.66	.66	.66	$.56	.65	.57	.56	....
21 to 21.9	.67	.67	.67	.57	.65	.59	.57	....
22 to 22.9	.68	.68	.68	.58	.65	.62	.58	....
23 to 23.9	.69	.70	.69	.59	.65	.65	.59	....
24 to 24.9	.70	.72	.70	.60	.66	.68	.60	....
25 to 25.9	.71	.74	.71	.61	.67	.71	.62	....
26 to 26.9	.72	.76	.72	....	.68	.74	.64	....
27 to 27.9	.73	.78	.73	....	.69	....	.66	....
28 to 28.9	.74	.80	.75	....	.70	....	.68	....
29 to 29.9	.76	.82	.77	....	.71	....	.70	....
30 to 30.9	.78	.84	.79	....	.72	....	.72	$.64
31 to 31.9	.80	.86	.81	....	.73	....	.74	.67
32 to 32.9	.82	.88	.83	....	.74	....	.76	.70
33 to 33.9	.84	.90	.85	....	.75	....	.78	.73
34 to 34.9	.86	.92	.87	....	....	....	....	.76
35 to 35.9	.88	.94	.89	....	....	....	....	.79
36 to 36.9	.90	.96	....	....	....	....	....	.82
37 to 37.9	.92	.98	....	....	....	....	....	.84
38 to 38.9	.94	1.00	....	....	....	....	....	.86
39 to 39.9	.96	1.02	....	....	....	....	....	.88
40 and up	.98	1.04	....	....	....	....	....	.90

*In all cases a field gathering charge of 5 cents per barrel will be made for receiving and delivering such oil into its Del Rey pipe line system.

(California Prices on Page 143)

TANK WAGON MARKETS

Tank wagon quotations for gasoline and kerosene in United States as furnished by the larger marketing concerns Mar. 10

ALL TANK WAGON AND SERVICE STATION QUOTATIONS INCLUDE TAXES

STANDARD OIL CO. (INDIANA)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Chicago*	12.0	13.0	3.0	9.0
Decatur, Ill.	14.4	15.4	3.0	9.0
E. St. Louis	13.7	14.7	3.0	8.2
Joliet	14.4	15.4	3.0	9.0
Peoria	14.4	15.4	3.0	9.0
Quincy	14.2	15.2	3.0	8.8
Davenport, Ia.	14.5	15.5	3.0	9.3
Des Moines	14.5	15.5	3.0	9.3
Keokuk	14.5	15.5	3.0	9.3
Sioux City	14.1	15.1	3.0	8.9
Duluth, Minn.	15.5	16.5	3.0	9.9
Mankato	13.1	16.0	3.0	9.7
Minneapolis	15.2	16.2	3.0	9.9
La Crosse, Wis.	14.2	15.2	2.0	10.0
Milwaukee	13.1	14.1	2.0	8.0
Madison	13.2	14.3	2.0	8.9
Detroit, Mich.	14.8	15.8	3.0	10.7
Grand Rapids	14.7	15.7	3.0	10.6
Saginaw	14.9	15.9	3.0	10.8
Evansville, Ind.	15.1	16.1	4.0	9.9
Indianapolis	15.3	14.3	4.0	10.1
South Bend	15.4	16.4	4.0	10.2
Fargo, N. D.	16.0	17.3	3.0	11.9
Huron, S. D.	16.3	17.3	4.0	10.7
Sioux Falls	15.0	16.9	4.0	10.4
K. C., Mo.	13.9	14.9	3.0	7.6
Springfield†	13.9	14.9	3.0	8.5
St. Louis†	10.9	11.9	2.5	8.3
St. Joseph	12.8	11.8	2.0	7.8
Wichita, Kans.	12.8	13.8	3.0	7.8
Bartlesville, Ok.	13.5	16.5	4.0	7.5

*Effective February 17, discounts on Q.D.A. in Chicago district 2 cents off service station price on purchases of 500 gallons and over; and 4 cents off service station on purchases of 1,000 gallons or more per calendar month.

†State tax 2 cents; remainder city tax.

Effective August 5, the following quantity discounts from the service station prices are allowed on monthly sales of gasoline: 500 gallons or more, 3 cents; 75,000 gallons or more, 4½ cents. Discounts are allowed each month and they are not cumulative. Delivery tickets showing date and quantity delivered must be sent to the seller before the tenth of the month to secure the discounts on the previous month's purchases.

PACIFIC COAST TERRITORY

Standard Oil Co. (California)

	Gasoline			Kero
	Wh'la'e price	Retail price	Incl'ds tax of	tank wagon
Fresno	19.0	19.0	3.0	17.0
San Francisco	19.0	19.0	3.0	15.5
Los Angeles	14.5	14.5	3.0	15.5
Reno, Nev.	22.0	20.0	4.0	19.0
Portland, Ore.	23.5	23.5	4.0	16.5
Seattle, Wash.	21.5	21.5	3.0	16.5
Tacoma	21.5	21.5	3.0	16.5
Spokane	22.0	22.0	3.0	20.5
Phoenix, Ariz.	20.5	22.5	5.0	20.0

Above prices are at company's plant or depots as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank wagon lots except in Phoenix where the discount is 3 cents plus a 2-cent special temporary discount subject to withdrawal at any time.

SOUTHERN DISTRICT

Standard Oil Co. (Kentucky)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Atlanta, Ga.	20.0	22.0	6.0	13.5
Augusta	20.0	22.0	6.0	15.5
Macon	20.0	22.0	6.0	13.0
Savannah	20.0	20.0	6.0	13.0
Birm'ham, Ala.	19.0	21.0	5.0	15.0
Mobile	19.0	21.0	4.0	15.0
Montgomery	19.0	21.0	4.0	15.5
Clarke'le, Miss.	18.0	20.0	5.0	13.5
Jackson	17.0	17.0	5.0	13.5
Natchez	18.0	20.0	5.0	13.5
Gulfport	16.0	16.0	5.0	13.5
Vicksburg	18.0	18.0	5.0	13.0
Jack'ville, Fla.	19.0	21.0	6.0	14.0
Miami	20.0	22.0	6.0	14.0
Pensacola	20.0	20.0	6.0	13.5
Tampa	19.0	21.0	5.0	13.0
Lexington, Ky.	17.0	18.0	5.0	14.5
Covington	17.0	18.0	5.0	13.5
Louisville	16.0	18.0	5.0	11.0
Ashland	17.0	19.0	5.0	13.0
Paducah	17.0	19.0	5.0	12.0
Bowling Green	19.0	21.0	5.0	14.5
Corbin	18.0	19.0	5.0	16.0

In addition to the state tax of 4 cents on gasoline, Montgomery has city tax of 1 cent on gasoline and one-half cent on kerosene. Kerosene prices in Georgia include 1-cent tax. In Florida, an inspection fee of 0.125 cent; in Alabama, an inspection fee of one-half cent on kerosene and one-fourth cent on gasoline. To Pensacola, Montgomery, Birmingham and Mobile state taxes add 1-cent levy tax. To Gulfport state tax add privilege tax of 2 cents.

Effective April 1, price to dealers 2 cents under posted tank wagon price.

ATLANTIC COAST DISTRICT

Standard Oil Co. (New Jersey)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Atl'tic City, N. J.	14.5	16.5	3.0	11.5
Newark	13.5	15.5	3.0	10.5
Annapolis, Md.	16.0	17.0	4.0	11.0
Baltimore	15.2	16.2	4.0	9.5
Cumberland	17.0	18.0	4.0	12.0
Wash'gton, D.C.	13.7	14.7	2.0	10.7
Danville, Va.	17.3	18.3	5.0	11.3
Norfolk, Va.	16.3	17.3	5.0	10.0
Petersburg	17.3	18.3	5.0	11.3
Roanoke	18.0	18.0	5.0	12.0
Richmond	16.7	17.7	5.0	10.7
Charles'n, W.Va.	16.5	17.5	4.0	11.5
Keyser	17.1	18.1	4.0	12.0
Parkersburg	15.2	16.2	4.0	10.2
Wheeling	16.4	17.4	4.0	11.4
Charlotte, N. C.	18.3	19.3	5.0	12.3
Hickory	18.6	19.6	5.0	12.6
Mt. Airy	18.5	19.5	5.0	12.5
Salisbury	18.5	19.5	5.0	12.5
Charleston, S.C.	17.3	18.3	6.0	10.3
Columbia	19.2	20.3	6.0	12.3

Effective February 26, Standard Oil Co. of New Jersey has increased its dealer and commercial account discounts 1 to 3 cents per gallon in Maryland.

A 2-cent per gallon discount off the gasoline tank wagon price is offered to dealers.

CENTRAL SOUTH DISTRICT

Standard Oil Co. (Louisiana)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
N. Orleans, La.*	18.5	19.5	6.0	12.0
Baton Rouge	17.5	18.5	5.0	13.0
Alexandria†	18.5	19.5	6.0	13.0
Lafayette*	18.5	19.5	6.0	13.0
Lake Charles*	18.5	19.5	6.0	13.0
Shreveport	17.5	18.5	5.0	13.0
Knoxville, Tenn.	20.0	21.0	5.0	15.0
Memphis	17.0	18.0	5.0	12.5
Chattanooga	18.5	19.5	5.0	13.0
Nashville	18.0	19.0	5.0	15.0
Bristol	20.0	21.0	5.0	14.0
Lt. Rock, Ark.	18.5	19.5	6.0	12.0

*Includes city tax of 1 cent. Louisiana kerosene prices include 1-cent state tax. New Orleans kerosene price also includes 1-cent city tax.

†Gasoline price at Alexandria includes 1-cent tax in Parish of Rapides.

Two-cent discount off gasoline tank wagon price to dealers and commercial accounts.

PENNSYLVANIA-DELAWARE AND PART OF NEW ENGLAND

Atlantic Refining Co.

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Pittsburgh, Pa.	14.0	19.0	...	12.0
Philadelphia	14.0	19.0	...	12.0
Scranton	14.0	19.0	...	12.0
Allentown	14.0	19.0	...	12.0
Altoona	14.0	19.0	...	12.0
Erie	14.0	18.0	...	11.0
Dover, Del.	17.0	19.0	3.0	12.0
Wilmington	17.0	19.0	3.0	12.0
Springf'd, Mass.	17.5	19.5	2.0	10.0
Worcester	17.3	19.3	3.0	10.0
Boston	14.5	16.5	2.0	10.0
Providence, R.I.	12.7	14.7	2.0	10.0
Hartford, Conn.	17.5	19.5	2.0	10.0
New Haven	17.6	19.6	2.0	10.0

*Includes tax of 3 cents. Pennsylvania tax is collected by the dealer and paid by him direct to the State. Atlantic Refining Co. recognizes a 2-cent per gallon discount on gasoline from its posted tank wagon markets on sales to dealers for purposes of resale. Atlantic Refining Co. also recognizes a maximum discount of 2 cents per gallon on gasoline to commercial accounts under contract for one year.

NEBRASKA

Standard Oil Co. (Nebraska)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Omaha	15.25	17.25	4.0	9.25
McCook	16.75	18.75	4.0	10.75
Norfolk	15.75	17.25	4.0	9.75
N. Platte	16.75	18.75	4.0	10.50
Scottsbluff	16.00	16.00	4.0	10.25

OHIO

Standard Oil Co. (Ohio)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Ohio points*	15.0	16.0	4.0	†13.0

*Dealers and commercial accounts 2 cents under tank wagon.

†Service station price 14 cents.

ROCKY MOUNTAIN DISTRICT

Continental Oil Co.

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Denver, Colo.	13.0	16.0	4.0	13.5
Pueblo	14.0	17.0	4.0	12.0
Grand Junction	18.0	19.0	4.0	17.0
Casper, Wyo.	15.0	18.0	4.0	10.0
Cheyenne	16.0	17.0	4.0	11.5
Butte, Mont.	19.0	22.0	5.0	16.0
Billings	20.0	23.0	5.0	14 5
Great Falls	20.0	23.0	5.0	16.0
Helena	20.0	23.0	5.0	16.0
Salt Lake, Utah	18.0	21.0	3.5	16.0
Albu'que, N. M.	16.0	20.0	5.0	14.0
Boise, Idaho	21.5	....	5.0	18.0
Twin Falls*	21.5	....	5.0	18.0

*Two and one-half cents off tank wagon to dealers at time of delivery.

STANOLIND FURNACE OIL IN CHICAGO

All dumps of 50 gallons or more 7

Note—Outside Chicago furnace oils discount of 1 cent per gallon is given on deliveries of 100 to 349 gallons and 1⅛ cents on deliveries of 350 gallons or more.

NAPHTHA

	Tank wagon	Tank car
Oleum spirits	12.0	8.0
V.M.&P. naphtha	14.0	9.5
Cleaners' naphtha	16.2	11.0
Stanisol	16.2	11.0

Tank wagon prices f.o.b. Chicago; tank car prices f.o.b. Whiting.

SOUTHWESTERN DISTRICT

Magnolia Petroleum Co.

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Dallas, Tex.	15.0	18.0	4.0	11.0
Fort Worth	15.0	18.0	4.0	10.0
Houston	15.0	19.0	4.0	11.0
San Antonio	15.0	19.0	4.0	10.0
El Paso	16.0	20.0	4.0	12.0
Texarkana	17.0	17.0	4.0	11.0
Muskogee, Ok.	12.0	15.0	4.0	9.0
Okla. City	10.0	12 0	4 0	10 0
Tulsa	12.0	15.0	4.0	10.0
Ft. Smith, Ark.	17 5	18 5	6 0	12.0
Little Rock	19.5	20.5	6.0	12.0

One-cent rebate made from posted station prices to cash purchasers in Louisiana, Arkansas and Tennessee.

NEW YORK AND PART OF NEW ENGLAND DISTRICT

Standard Oil Co. (New York)

	Gasoline			Kero.
	Tank wagon	Service station	Incl'ds tax of	tank wagon
Albany, N. Y.	16.6	17.6	2.0	15.6
New York*	15.3	15.3	2.0	14.3
Buffalo	15.8	15.8	2.0	14 8
Rochester	16 0	16.0	2.0	14.0
Syracuse	16.8	16.8	2.0	14.8
Boston, Mass.	15.5	15.5	2.0	13.5
Augusta, Me.	18.8	18.8	4.0	14.8
Manch'tr, N. H.	18.4	18.4	4.0	14.0
Burlington, Vt.	19.3	19.3	4.0	15.3

*Prices in steel barrels.

TANK WAGON CHANGES

Standard Oil Co. of Indiana, effective March 5, reduced its tank wagon and service station markets 2 cents throughout its entire territory except at the following points: East St. Louis, tank wagon down 2 cents to 13.7 cents, service station remaining at 14.7 cents; Mankato, service station down 2.9 cents to 13.1 cents, with service station price remaining at 16 cents; service station prices were reduced from 16.2 cents to 14.3 cents, at Madison, from 16.8 cents to 15.8 cents at Detroit, from 17.5 cents to 17.3 cents at Huron, S. D., from 17 cents to 16.8 cents at Sioux Falls. At Fargo the service station price was cut from 17 cents to 16 cents, and at Wichita, Kans., the tank wagon market was reduced 2 cents to 12.8 cents and the service station price remained the same, 13.8 cents. Kerosene markets were also reduced 2 cents.

Standard Oil Co. of Nebraska on the same day made similar reductions throughout its territory except at those points where the price had been normal.

Continental Oil Co., effective March 6, reduced its tank wagon and service station postings in Montana and Wyoming 2 cents, except at Butte, Billings, Helena and Great Falls. Kerosene was reduced at all points 2 cents.

Effective March 7, Continental reduced the tank wagon and service station markets 1 cent throughout Colorado, Utah and Idaho, except at Denver, Colo. In these states the kerosene price was cut 1 cent, except at Grand Junction where the cut was 2.5 cents. On March 4, Standard Oil Co. of Kentucky reduced tank wagon and service station markets at Jackson, Miss., 1 and 3 cents, respectively, to 17 cents each. This company cut the service station price on gasoline 2 cents to 20 cents, at Pensacola, Fla., on the same day. Standard Oil Co. of Louisiana, effective March 3, advanced the tank wagon and service station postings at New Orleans 2 cents, making the new prices 18.5 cents and 19.5 cents, respectively.

CRUDE OIL PRICE CHANGES

Stanolind Crude Oil Purchasing Co. posted a reduced schedule of crude oil prices on March 5, affecting Kansas, Oklahoma, North Texas, East Central Texas (Mexia fault district) and Central Texas. By March 10 prices had been met by all companies in the same area excepting the Gulf Refining Co. and Gypsy Oil Co. Magnolia Petroleum Co. made slightly different prices on lowest grades.

Humble Oil & Refining Co. posted lower prices in West Texas and New Mexico and Texas Panhandle and Southwest Texas on March 10.

Standard Oil Co. of Louisiana and The Texas Company posted lower prices in North Louisiana and Arkansas, effective March 10.

Ohio Oil Co. posted lower prices in Lima, Indiana, Western Kentucky and Illinois, and in Wyoming, on March 7 and quit posting in Artesia, N. M.

Standard Oil Co. of California and Union Oil Co. posted new and reduced price schedule in California, but their respective prices are not uniform in the same fields or for the same grades. Effective March 10.

Joseph Seep Purchasing Co. reduced the price of Corning, Ohio, crude March 10.

Texas Pipe Line Co. reduced Markham, Texas, crude on March 10.

GULF COAST MARKETS SHOW LITTLE CHANGE

HOUSTON, Tex., Mar. 10.—The Gulf Coast refinery market indicated no important changes the past week. Fuel oil and gas oil maintained a steady tone in the face of continued inactivity. Pale and red oils were weak but reflected no greater weakness than previously. Gasolines were uncertain with demand slow.

The Gulf Coast refinery situation seems to be one of doubt to most observers, and the outcome apparently hinges on a number of circumstances, the future of which cannot be predicted. There has been no change in fuel oil and gas oil for several months and refiners are reported to be in fair condition although there has been virtually no spot market movement in that period. There has been no distress material and a minimum quotation of 65 cents for cargo fuel and 3⅛ cents for gas oil has been maintained. The demand for Gulf Coast fuel has been low largely due to the fact that competitive areas and other countries have been able to place this product on the East Coast at considerably lower prices.

The offering of pale and red oils at concessions under posted quotations has shown no increase over the preceding week and considering general conditions in the crude situation it is uncertain as to what trend will be followed by lubricating oil stocks.

Gasolines continued to be quoted at low prices influenced by North Texas contracts and competition and actual demand for spot material was extremely slack, being reflected in a generally unsettled tone.

CRUDE OIL PRICES

(Continued from Page 141)

Somerset (Oct. 25, 1929)†‖.....
Same as Mid-Continent gravity scale up to and including 38-38.9° at..... 1.01

*Posted by Humble Oil & Refining Co. and Magnolia Petroleum Co. †Magnolia Petroleum Co., Humble Oil & Refining Co., Crown Central Pipe Line Co. ‡Thrall prices same as North Central Texas less 19½ cents per cwt. freight. §Grayburg Oil & Refining Co., Pioneer Oil & Refining Co. and Texas Petroleum Products Co. ‖Pioneer Oil & Refining Co.

EASTERN STATES

Joseph Seep Purchasing Agency
(Effective Nov. 12, 1930)

Penna Grade Oil in National Transit Lines (Pennsylvania) $1.85
Penna Grade Oil in Southwest Pennsylvania Lines (Pennsylvania) 1.80
Penna Grade Oil in Eureka Pipe Line Lines (West Virginia) 1.70
Penna Grade Oil in Buckeye Pipe Line Lines (Ohio) (Sept. 14, 1930)..... 1.45
Corning Grade Oil in Buckeye Pipe Line Co.'s Line (Mar. 6, 1931)..... .90
Ragland Grade Oil in Cumberland Pipe Lines (Kentucky) 1.10
Wayne District Oil in Cumberland Pipe Lines 1.17

Tide Water Pipe Co.

Bradford district (Nov. 12, 1930).....$2.15
Allegany district (Nov. 12, 1930)..... 2.15

Pure Oil Co.

Cabin Creek, W. Va. (Nov. 12, 1930)...$1.70
Kelly Creek, W. Va. (Nov. 12, 1930)... 1.70
Bradford Hollow, W. Va. (Nov. 12, 1930) 1.70

MIDDLE WESTERN STATES

Ohio Oil Co.
(Effective Mar. 6, 1931)

Lima .....$ .90
Wooster ..... .99
Illinois ..... .80
Indiana ..... .80
Princeton ..... .80
Plymouth ..... shut in
Western Kentucky ..... .75
Midland, Mich.* 1.10
Dundee, Mich. (Oct. 26)†.....
.....Same as Mid-Continent gravity scale
Upper and Lower Traverse Sands, Mich. (Oct. 28, 1930)† .....
.....Same as Mid-Continent gravity scale
Cumberland, Clay, Barren, Clinton and Monroe Counties, Kentucky (Oct. 28)‡ .85
Oil City, Ky.§ (Mar. 7, 1931)..... .70
Oil Springs (Canada) (Oct. 28)‖..... 1.57
Petrolia (Canada) (Oct. 28)†..... 1.50
Alberta (Canada)‖:
50° and above 2.71
45 to 45.9 ..... 2.12

*Posted by Pure Oil Co. †Posted by Standard of Indiana for boat shipment. ‡Posted by Paragon Development Co. ‖Posted by Stoll Refining Co. ¶Posted by Imperial Oil, Ltd. ‖Posted by Imperial Oil, Ltd., and Regal Oil & Refining Co. of Calgary.

MEXICAN CRUDE

Panuco* .....$ .56

*F.o.b. ship, based on January transactions and exclusive of taxes and bar dues.

WILBUR AND LAMONT CONSIDERING IMPORTS

WASHINGTON, D. C., Mar. 7.—Large importers of oil, with one exception, have agreed to "go as far as they can" to assist producers in the United States, it was announced by the Secretary of the Interior, Ray Lyman Wilbur, following a discussion of the oil situation by President Hoover and the Cabinet.

Pending negotiations being conducted with the importers by Doctor Wilbur and the Secretary of Commerce, Robert P. Lamont, the President has reserved decision on the request of governors of the oil-producing states for a conference by independent producers with the Federal Trade Commission or the Federal Oil Conservation Board, Doctor Wilbur stated. The request came from the governors of Kansas, Texas, Oklahoma, New Mexico and California.

Doctor Wilbur, as chairman of the Oil Conservation Board, stated at the White House after the Cabinet meeting that the board, through Secretary Lamont and himself, is continuing its efforts to get large eastern importers to agree on a plan for limitation of oil imports so as to harmonize imports with production in this country.

Doctor Wilbur issued the following statement:

"Secretary Wilbur, as chairman of the Federal Oil Conservation Board, states that Secretary Lamont has been in conference for some days with the various companies importing oil into this country in the hope that a more harmonious relationship between imports and home production could be worked out.

"The Mellon interests and the Standard of New Jersey have already decided to go as far as they can in assisting our own producers. Other companies seem willing to agree, with the exception of the Standard of Indiana, which for some reason has not yet expressed a willingness to meet the situation.

"The President sent the following telegram in answer to that of the governors of the oil-producing states:

"'In respect to your telegram, Secretary of Commerce Lamont is in negotiation with the larger oil companies in respect to imports in the interest of both the producers and consumers. Herbert Hoover.'"

The Tariff Commission has had its power to investigate costs of production of oil and petroleum products at home and abroad extended so that it will have another report to make to the next Congress. The resolution authorizes ascertainment of information abroad with especial reference to Peru, the Dutch West Indies and other competitors of American oil companies.

H. F. WRIGHT CHAIRMAN OF A.I.M.E. SECTION

At the annual meeting of the Mid-Continent section of the American Institute of Mining and Metallurgical Engineers held in Tulsa on the evening of March 9, Harry F. Wright, consulting geologist and petroleum engineer, was elected chairman for the ensuing year. The other officers are D. L. Trax, Gypsy Oil Co., first vice chairman; Clarel B. Mapes, Mid-Continent Oil & Gas Association, second vice chairman; Wallace H. Collins, Shell Petroleum Corp., secretary-treasurer. The executive committee is made up of H. H. Power, C. C. Rae, H. B. Goodrich and C. V. Sidwell.

The retiring officers made reports of the past year's activities, which were approved as read.

In the technical session that followed immediately after the installation of the new officers, Russell S. Knappen, Gypsy Oil Co., Tulsa, made a report of his trip to the annual meeting of the A.I.M.E. at New York City and gave a summary of technical sessions attended.

The next speaker was W. P. Z. German, of the Skelly Oil Co., who summarized his paper presented before the annual meeting entitled, "Some Legal Aspects of Unit Operation." Mr. German is recognized as an authority of the legal phases of this important subject and his remarks were followed with much interest.

Ben E. Lindsly, petroleum engineer with the United States Bureau of Mines at Bartlesville, Okla., reviewed his paper entitled "Preliminary Report on an Investigation of the Bureau of Mines Regarding the Solubility of Natural Gas in Crude Oil." Mr. Lindsly's work has been carried on in Kettleman Hills and Ventura Avenue Fields, California, as well as in the Oklahoma City Field, and therefore deals largely with the behavior of gas and oil under heavy pressures and reveals some rather startling results that

H. F. Wright

seem to indicate that many new factors will have to be taken into consideration in estimating oil reserves in pools in the future.

Other papers that were presented at the annual meeting and discussed Monday night are "Economics of Crude Oil Potential," by Joseph E. Pogue, and presented by C. B. Mapes; "Problem of Proration on Basis of Gas Energy," by Eugene A. Stephenson, and discussed by H. F. Wright; and "Russian Oil Fields," by B. B. Zavoico.

CRANFILL RE-ELECTED PRESIDENT OF I.P.A.

FORT WORTH, Tex., Mar. 7.—Tom E. Cranfill of Dallas will head the Independent Petroleum Association of Texas for another year. He was re-elected at the annual convention in this city.

Other officers elected were Claude C. Wilde of Fort Worth, vice president; Mel Davis, Pampa; P. B. Flynn, Wichita Falls; B. F. Robbins, Big Spring; George Calvert, Fort Worth; Harry Pennington, San Antonio, and J. A. Deering, Houston, district vice presidents.

After a talk by State Senator Clint Small of Wellington, a resolution supporting ratable purchase of natural gas was adopted. Other resolutions called for further experimentation to discover new uses for petroleum and asked the legislature to appropriate $25,000 for a laboratory at the University of Texas equipped to analyze petroleum and its products.

New directors included: W. B. Saulsbury, M. F. Roche and Mel Davis, Pampa; S. D. McIlroy, Walter Caldwell, Ed R. Mayer and Joe Danciger, Amarillo; Joe Edwards, B. F. Robbins, R. T. Pincer, Big Spring; B. H. Blakeney and E. G. Bedford, Midland; Clayton W. Williams, Fort Stockton; E. L. Lockhart, El Paso; R. L. Cannon, Rupert P. Ricker, George Morgan, George Henshaw, Carl Cromwell and P. G. Northrup, San Angelo; C. H. Lockhart and J. Wheat, Pecos; P. B. Flynn, E. H. Eddleman, Clifford Mooers, T. O. Shappell, Roy B. Jones, T. P. Hunter and Walter Campbell, Wichita Falls; R. F. Windfohr, E. R. Riggs, G. Dillard Hinson, Graham; Lewis D. Ryan, Burkburnett; E. W. Moutray and T. F. Grisham, Abilene; Tom Bryant, Cross Plains; M. B. Cheney and Leon Shield, Coleman; H. P. Evans and W. G. Sawyer, Brownwood; J. T. Anderson, Cisco; Neil Moore and A. H. Rhodes, Eastland; W. D. Conway, Ranger; B. F. Weekley, George Calvert, W. T. Lewis, John A. Thompson, J. C. Maxwell, Claude C. Wilde and C. L. Morgan, Fort Worth; R. C. Fleming, Albany; J. D. Meredith, Moran; J. D. Sandefer, Jr., J. B. Dunnigan and C. K. West, Breckenridge; Tom E. Cranfill, Truitt Cranfill, E. B. Germany and Clint Murchison, Dallas; L. Beauchamp and W. E. McKinney, Tyler; Guy A. Blount, Nacogdoches; W. C. Stroube and R. L. Wheelock, Corsicana; E. L. Smith, Mexia; A. H. Bell, Waco; J. P. Nash, Austin; Harry Pennington, C. O. Maddox, A. A. Buchanan, C. L. Witherspoon, R. F. Schoolfield and Grover C. Shaw, San Antonio; C. R. Cole, George Marshall and Usher Carson, Laredo; Nelson Pruett and E. V. Woolsey, Luling; J. A. Deering, George Heyer, J. M. West, Jr., T. J. Mullin and Ferdinand Heine, Houston; Marrs McLean, Beaumont; Earl Hankamer, Orange, and J. R. Astin, Bryan.

RECONSIDER KANSAS BILL

TOPEKA, Kans., Mar. 10.—Chairman Bradfield of the senate oil and gas committee announced the committee had voted to reconsider its adverse action on the oil proration bill, to report the measure to the senate without recommendation and with amendments limiting application.

STANDARD OIL CO. OF CALIFORNIA

Current Prices for Crude Oil at the Well Effective 7 a.m. March 10, 1931

Gravity—	Santa Fe Springs	Seal Beach	Long Beach	Torrance	Rosecrans, Athens, Dominguez	Montebello	Huntington Beach	Coyote Hills	Richfield	Brea-Olinda	Inglewood	Elwood	Playa del Rey	Whittier, La Habra	Midway-Sunset, Elk Hills, Buena Vista Hills	Lost Hills	Coalinga	Wheeler Ridge
14-14.9°	..	.65	.65	.65	..	.65	.65	.65	.65	.65	.65	..	..	.65	.55	.55	.55	.55
15-15.9	..	.65	.65	.65	..	.65	.65	.65	.65	.65	.65	..	..	.65	.55	.55	.55	.55
16-16.9	..	.65	.65	.65	..	.65	.65	.65	.65	.65	.65	..	..	.65	.55	.55	.55	.55
17-17.9	..	.65	.65	.65	..	.65	.65	.65	.65	.65	.65	..	..	.65	.55	.55	.55	.55
18-18.9	..	.65	.65	.65	..	.65	.65	.65	.65	.68	.68	..	..	.65	.56	.56	.55	.55
19-19.9	..	.65	.65	.65	..	.65	.66	.65	.65	.69	.68	..	..	.65	.56	.57	.55	.55
20-20.9	..	.65	.67	.66	..	.65	.68	.65	.67	.71	.70	..	.65	.65	.56	.59	.55	.55
21-21.9	.65	.66	.70	.68	..	.65	.70	.66	.69	.72	.72	..	.66	.65	.57	.61	.55	.55
22-22.9	.65	.68	.71	.70	..	.65	.71	.67	.71	.74	.74	..	.67	.66	.58	.62	.57	.55
23-23.9	.65	.70	.72	.71	..	.65	.73	.69	.74	.75	.75	..	.68	..	.61	.64	.59	.55
24-24.9	.65	.72	.72	.72	.65	.66	.75	.71	.76	.77	.77	..	.69	..	.63	.66	.61	.56
25-25.9	.66	.75	.75	.74	.65	.68	.77	.73	.78	.78	.81	..	.70	..	.66	.67	.62	.58
26-26.9	.68	.77	.76	.75	.65	.70	.78	.74	.80	.80	.85	..	..	..	.69	.69	.64	.61
27-27.9	.70	.80	.77	.77	.66	.72	.80	.76	.82	.82	.89	..	..	..	.71	.70	.66	.63
28-28.9	.72	..	.79	.78	.69	.74	.81	.78	.84	.83	.93	..	..	..	.74	.72	.69	..
29-29.9	.75	..	.81	..	.72	.76	.83	.80	.86	.85	..	..	..	..	.76	.73	.71	..
30-30.9	.78	..	.83	..	.75	.78	.85	.82	.88	.88	..	..	..	..	.78	.74	.73	..
31-31.9	.80	..	.85	..	.78	..	.87	..	..	.88	..	..	..	..	.80	.76	.76	..
32-32.9	.83	..	.87	..	.81	..	.89	..	..	..	..	..	..	..	.83	.77	.77	..
33-33.9	.85	..	..	..	.84	..	..	..	..	..	..	..	..	..	.86	..	.79	..
34-34.9	.87	..	..	..	.88	..	..	..	..	..	..	.85	..	..	..	..	.81	..
35-35.9	.90	..	..	..	.91	..	..	..	..	..	..	.88	..	..	..	..	.83	..
36-36.9	.92	..	..	..	.94	..	..	..	..	..	..	.91	..	..	..	..	..	..
37-37.9	.95	..	..	..	.97	..	..	..	..	..	..	.94	..	..	..	..	..	..
38-38.9	.97	..	..	..	1.00	..	..	..	..	..	..	.97	..	..	..	..	..	..
39-39.9	1.00	..	..	..	1.03	..	..	..	..	..	..	1.00	..	..	..	..	..	..
40-40.9	1.00	..	..	..	1.06	..	..	..	..	..	..	1.03	..	..	..	..	..	..
41-41.9	1.00	..	..	..	1.10	..	..	..	..	..	..	1.07	..	..	..	..	..	..
42 and above	1.00	..	..	..	1.13	..	..	..	..	..	..	1.10	..	..	..	..	..	..

Note—Elwood prices are f.o.b. ships. Playa del Rey crude oil is subject to a gathering charge of 5 cents per barrel.

Low Prices Reduce Dividend Payments

Disbursements by Standard Group of Companies $62,032,416 in First Quarter Against $83,047,644 in Previous Quarter

Cash dividend payments of the Standard Oil group for the first quarter of 1931 will total approximately $62,032,416, according to figures compiled by Carl H. Pforzheimer & Co. This compares with $83,047,644 paid in the final quarter of 1930 and $66,722,168 in the first quarter of 1930. Disbursements in the last quarter of 1930 included an extra payment by Imperial Oil, Ltd., amounting to over $13,000,000.

The decline in first quarter disbursements this year is accounted for by the prevailing low level of prices of crude oil and refined oil products. The companies engaged largely in crude oil production were most severely affected. This is reflected in the reduction in dividends of Ohio Oil Co. and South Penn Oil Co., each having reduced the first quarter dividend to 25 cents a share from 50 cents a share previously paid quarterly.

Among the larger Standard Oil companies, Standard Oil Co. of Indiana reduced its dividend to 50 cents a share in the first quarter of 1931 against 62½ cents a share paid in the final quarter of 1930. Among other companies reducing payments were Atlantic Refining Co., Standard Oil of Nebraska and Standard Oil of Kansas.

In the pipe line group, Prairie Pipe Line Co. declared the regular quarterly dividend of 75 cents a share but omitted the extra of 50 cents a share. Cumberland Pipe reduced its dividend to 50 cents quarterly from $1 and New York Transit to 25 cents, against 40 cents previously paid quarterly.

Cities Service-Richfield

Cities Service Co. has obtained a thorough working control of Richfield Oil Co. of California, it is reported in New York, and will shortly announce plans for the operation of Richfield units. Following the exchange of a considerable number of Richfield common stock for Cities Service common, on the basis of one share of Cities Service for four of Richfield, Cities Service Co. offered to exchange two shares of its preference B stock and one share of its common for each five shares of the preferred capital stock of Richfield Oil Co. of California.

Barnsdall Corp.

Report of Barnsdall Corp. and subsidiaries for year ended December 31, 1930, shows net income of $5,130,890 after interest, federal taxes, depreciation, depletion, intangible development costs, etc., equivalent to $2.27 a share (par $25) on 2,258,779 shares of combined Class A and B stocks outstanding at end of year. This compares with net income in 1929 of $7,205,161, equal to $3.20 a share on 2,247,602 average number of combined shares outstanding during that year and $3.19 a share on 2,258,327 combined shares outstanding at end of the year.

E. B. Reeser, president, said the company spent more than $1,000,000 in 1930 in enlarging and modernizing its refineries, but as these improvements were not completed until December, the benefits were not reflected in the report.

Empire Gas & Fuel

Empire Gas & Fuel Co. has declared the regular monthly dividends of 66⅔ cents on the 8 per cent preferred, 58⅓ cents on the 7 per cent preferred, 54 1/6 cents on the 6½ per cent preferred and 50 cents on the 6 per cent preferred stocks, all payable April 1 to stock of record March 14.

Signal Oil & Gas

Signal Oil & Gas Co. reports for year ended December 31, 1930, net profit of $689,716 after charges, depreciation, depletion, federal taxes, etc., equivalent to $3.04 a share (par $25) on 226,940 shares of combined Class A and Class B stocks. This compares with net profit in 1929, of $1,280,829 or $5.75 a share on 222,490 combined shares outstanding at end of that year.

Washington Oil

Washington Oil Co. reports for year ended December 31, 1930, net profit of $37,690 after taxes, depreciation and depletion, equal to $1.59 a share (par $25) on 23,686 shares of capital stock. This compares with net profit of $152,314 in 1929, equal to $7.70 on 19,767 average number of shares outstanding during the year and $6.43 a share on 23,686 shares outstanding at the end of the year.

Directors of Washington Oil Co. are not scheduled to meet until April 20. Three dividends of 75 cents each were paid last year, on March 20, June 20 and September 20. No dividend has thus far been declared this year.

Phillips Petroleum

Phillips Petroleum Co. directors omitted the quarterly dividend of 50 cents due at this time.

Frank Phillips, president of Phillips Petroleum Co., made the following statement:

"Because of demoralized prices of petroleum and its products, which are the lowest since organization of the company in 1917, an operating loss for the last quarter of 1930 is shown, in addition to heavy shrinkage in inventory values. It is therefore deemed to the best interests of the stockholders to conserve cash until conditions improve and the program now under way is completed, which should result in ultimate larger profits under normal conditions than could otherwise be obtained. Audit of the company will be completed and annual statement mailed to stockholders within two weeks."

Prairie Oil & Gas

Report of Prairie Oil & Gas Co. for year ended December 31, 1930, shows net income of $2,216,084 after depreciation, depletion, federal taxes, cancelled and surrendered leases, etc., but excluding premium on sale of stock, equivalent to 91 cents a share (par $25) on 2,441,431 shares of stock. This compares with $14,331,643 or $5.89 a share on 2,433,365 shares in 1929.

Rio Grande Oil

Rio Grande Oil Co. for year ended December 31, 1930, reports net income of $3,379,787 after federal taxes, depreciation, depletion, amortization, etc., equivalent to $2.73 a share on 1,236,270 no-par shares of capital stock. This compares with $5,659,943, or $4.58 a share, in 1929.

Current assets as of December 31, 1930, amounted to $9,329,912 and current liabilities $7,181,160, comparing with $6,041,857 and $4,017,664 respectively, at close of 1929.

Producers & Refiners

Producers & Refiners Corp. and subsidiaries report for year ended December 31, 1930, net loss of $1,985,683 after depreciation, depletion, interest, taxes, development expenses, etc., comparing with net loss of $1,136,627 in 1929.

Standard Oil of Ohio

Standard Oil Co. of Ohio has declared the regular quarterly dividends of 62½ cents on the common stock, payable April 1 to stock of record March 16 and $1.25 on the 5 per cent preferred, payable April 15 to stock of record March 31.

Mountain Producers

Mountain Producers Corp. declared a quarterly dividend of 25 cents, payable April 1 to stock of record March 14. This places the stock of the company, which operates in the Salt Creek oil field of Wyoming, on $1 annual basis, against $1.60 previously.

Salt Creek Producers

Salt Creek Producers Association, Inc., and subsidiaries report for year ended December 31, 1930, profit of $2,306,663 after charges and federal taxes, but before depletion, comparing with $2,723,991 in 1929.

Continental Oil

Report of Continental Oil Co. and subsidiaries for year ended December 31, 1930, shows net profit of $255,598 after taxes, interest, depreciation, depletion, intangible drilling costs, cancelled leases, minority interests, adjustment of inventories, etc., equivalent to 5 cents a share on 4,694,062 no-par shares of capital stock which will be outstanding when all shares of Continental Oil Co. of Maine have been exchanged. In 1929 company reported net profit, representing operations of the Marland Oil Co. for the entire year 1929 and operations of the properties formerly owned by Continental Oil Co. (Maine) for the last six months of 1929 only, of $9,028,660, equal to $1.90 a share on 4,743,103 shares of stock. The net profits of Continental Oil Co. (Maine) in first six months of 1929, amounting to $1,058,419, were taken over as assets in that year. In 1930 company wrote off $4,198,772 from crude and refined inventories.

Salt Creek Consolidated

Salt Creek Consolidated Oil Co. declared a quarterly dividend of 7 cents, payable April 1 to stock of record March 14. This places the stock on 28-cent annual basis, against 40 cents previously.

Twenty Representative Stocks

The Oil and Gas Journal's weekly average price of 20 representative petroleum stocks listed on the New York Stock Exchange and New York Curb, based on closing quotations for Wednesday, was as follows:

July 2	44.13	Nov. 5	31.77
July 9	44.11	Nov. 12	30.18
July 16	46.42	Nov. 19	31.54
July 23	46.06	Nov. 26	30.86
July 30	44.89	Dec. 3	30.53
Aug. 6	45.24	Dec. 10	28.57
Aug. 13	43.53	Dec. 17	25.42
Aug. 20	43.79	Dec. 24	25.68
Aug. 27	42.83	Dec. 31	26.15
Sept. 3	42.71	Jan. 7	27.56
Sept. 10	42.84	Jan. 14	27.31
Sept. 17	42.43	Jan. 21	27.55
Sept. 24	40.62	Jan. 28	27.26
Oct. 1	37.78	Feb. 4	27.26
Oct. 8	35.85	Feb. 11	28.76
Oct. 15	35.21	Feb. 18	28.53
Oct. 22	31.88	Feb. 25	29.33
Oct. 29	32.30	Mar. 4	27.67

CREOLE PRODUCTION

Production of Colon Oil Corp.'s subsidiary in Venezuela for the week ending February 27 was 167,645 bbls.

STANDARD OIL STOCKS ON NEW YORK CURB

Quotations Compiled by Francis, Bro. & Co., Associate Members of New York Curb, Kennedy Building, Tulsa, Okla.

1931 High	1931 Low	Week ended March 4 Sales	High	Low	Close	Stocks—	Outstanding capital	Par value	Div. rate	Last paid	1928 High	1928 Low	1929 High	1929 Low	1930 High	1930 Low
½	⅛	100	¼	¼	¼	Atlantic Lobos	499,448	N.P.	....	5-28-30	..	..	..	..	1	¼
12⅞	10	100	10¼	10¾	10¼	Borne Scrymser	$1,000,000	$25	$1SA	10-15-30	56½	44½	46½	25	25	11¼
48	40	100	48	48	48	Buckeye Pipe Line	$10,000,000	$50	$1Q	12-15-30	76	53	74½	55	69	39⅞
125	110	100	125	125	125	Chesebrough Mfg.	$3,000,000	$25	$1Q	12-30-30	161	117	210	130	184⅞	104¼
30	20⅝	100	25	25	25	Cumberland Pipe Line	$1,500,000	$50	50cQ	12-15-30	114	67	75¾	40	65¾	20¼
29¾	27	100	28	28	28	Eureka Pipe Line	$5,000,000	$100	$1Q	2- 2-31	88	64⅛	70½	42	54¾	26
2⅞	1⅞	100	2½	2½	2½	Galena Signal Oil	$16,000,000	$100	....	.....	13	4¼	6½	3	7	2½
72	57⅝	1,200	61½	60⅛	60⅛	Humble Oil & Refining	$74,103,300	$25	50cQ	1- 2-31	114¾	59½	128	74⅛	119	57¼
18¼	16⅜	1,100	16⅝	16⅜	16½	Imperial Oil of Canada	(sh) 26,421,768	N.P.	12½cQ	3- 2-31	104	56¾	41	22	30	15
21⅛	16	100	21⅛	21⅛	21⅛	Indiana Pipe Line	$3,000,000	$10	50cQ	2-14-31	91⅞	74⅜	41⅞	26	41	14½
15½	13⅛	1,100	13¾	13⅝	13¾	International Petroleum	(sh) 14,247,088	N.P.	25cQ	12-15-30	55	35	30⅜	15	24	11⅜
14	12¼	300	13¼	13¼	13¼	National Transit	$6,362,500	$12.50	25cQ	12-15-30	32⅜	19⅜	25½	10⅛	22⅜	11½
14½	10¼	100	10⅜	10⅜	10⅜	New York Transit	$1,000,000	$10	40cQ	1-15-31	75	38½	17½	10	21⅜	10⅛
30	28	100	30	30	30	Northern Pipe Line	$2,000,000	$50	$2SA	1- 2-31	69	56½	63	41	54	26¼
15½	13⅛	100	14	14	14	Penn Mex Fuel	$10,000,000	$25	....	12-15-30	84	28	44½	20	32	12
7½	6	400	7	7	7	Solar Refining	$4,000,000	$25	....	12-20-29	..	..	50	29	33	4⅞
14	10	100	12¼	12¼	12¼	Southern Pipe Line	$1,000,000	$10	50c	3- 2-31	19	15	22½	13	20⅞	8⅜
23⅞	19⅛	100	19¾	19¾	19¾	South Penn Oil	$30,000,000	$25	50cQ	12-31-30	71⅞	36¾	60¼	35⅛	45⅞	16⅛
36	33	200	36	35¼	36	Southwest Pennsylvania Pipe Line	$1,750,000	$50	$1Q	12-31-30	102	70	70	60	64	32
38½	33⅛	6,100	33⅝	33⅛	33⅛	Standard Oil of Indiana	$348,175,069	$25	50cQ	12-15-30	95⅞	70⅞	63	45	59⅞	30
23⅝	20⅜	1,200	23	22⅝	22⅞	Standard Oil of Kentucky	$25,654,516	$10	40cQ	12-31-30	179¾	122¼	46⅞	29	40½	18⅝
..	..	No sales.				Standard Oil of Nebraska	$4,649,225	$25	50cQ	12-31-30	54⅞	39⅞	50¼	40	48⅞	34⅝
62½	49¾	900	54½	54	54	Standard Oil of Ohio	$14,000,000	$25	62½cQ	1- 2-31	134	71	129	60	108½	43¼
..	..	No sales.				Swan-Finch Co.	$861,466	$25	....	1-15-29	23½	16	18	10	10	4
69¾	52⅝	2,600	63⅛	60¼	62	Vacuum Oil Co.	$126,180,350	$25	$1Q	12-20-30	111	72	133¾	75	97⅞	45⅝

*Plus 50 cents extra. †Plus 10 cents extra. ‡Plus 25 cents extra. x Ex-dividend.

INDEPENDENT OILS ON NEW YORK CURB

Quotations Compiled by Francis, Bro. & Co., Associate Members of New York Curb, Kennedy Building, Tulsa, Okla.

1931 High	1931 Low	Week ended March 4 Sales	High	Low	Close	Stocks—		Outstanding capital	Par value	Div. rate	Last paid	1928 High	1928 Low	1929 High	1929 Low	1930 High	1930 Low
1	⅞	1,400	1	⅞	⅞	American Maracaibo	(sh)	700,000	N.P.	....	.....	9½	3⅛	8⅝	1⅛	4½	½
16⅞	14¾	200	14¾	14¾	14¾	British American Oil Corp.		1,311,321	N.P.	20cQ	1- 2-31	55	32¾	62	7⅞	23	13⅝
2⅜	½	7,000	2¼	2⅛	2⅛	Carib Syndicate		$131,250	25c	....	.....	4½	3⅞	4⅞	1	2¾	⅝
20¾	15	18,900	18¾	18	18⅜	Cities Service	(sh)	24,290,359	N.P.	30cA†	3- 2-31	90⅞	54	68⅛	20	44¼	13½
84¾	79¾	200	83⅜	83⅜	83⅜	Cities Service pfd.	(sh)	1,500,000	N.P.	50cM	3- 2-31	103¼	94½	98¾	84	93⅞	78¼
½	⅛	100	5/16	5/16	5/16	Colombia Syndicate		$2,000,000	$1	....	.....	3¼	.76	2	½	¾	⅛
2¾	2	800	2	2	2	Consolidated Royal		$5,000,000	$10	7½cQ	1-25-31	8⅞	6¼	11⅛	2½	5⅞	2
3½	3⅛	200	3¼	3¼	3¼	Creole Petroleum	(sh)	5,977,873	N.P.	....	.....	17½	9½	11¾	5⅝	7⅝	3
⅝	⅜	300	½	½	½	Crown Central		.....	....	....	.....	..	..	..	..	..	..
5	4	100	4	4	4	Darby Petroleum		1,019,392	N.P.	....	10-15-30	33½	3¼	26	6½	21¾	4¼
6	2⅝	1,500	4⅝	4¼	4½	Derby Oil & Refining	(sh)	500,000	N.P.	....	.....	2¼	1	11	2	11	2
32½	30	75	32½	30	30	Derby Oil & Refining pfd.		48,500	N.P.	....	.....	21⅛	7½	44	20¾	60	30
75½	63¾	1,500	66⅞	65¼	66½	Gulf Oil Corp.	(sh)	4,504,921	$25	37½cQ	1- 1-31	165	101⅛	209	115	166⅞	58½
⅝	⅜	700	½	⅜	⅜	Intercontinental Petroleum		$5,682,000	$5	....	.....	3⅜	1	2⅞	⅜	1⅜	⅝
1⅞	⅝	500	1⅞	1½	1½	Kirby Petroleum	(sh)	750,000	N.P.	....	.....	3	1¼	3⅝	1¼	3	⅞
1	⅝	100	⅞	⅞	⅞	Leonard Oil & Development		$50,000,000	$25	....	.....	9⅜	5⅛	6⅛	1	4¾	½
6¾	5⅝	100	6½	6½	6½	Lion Oil & Refining	(sh)	250,000	N.P.	....	10-27-30	43⅞	20	38⅞	18	29	4⅞
25	23½	100	23½	23½	23½	Lone Star Gas (new)	(sh)	5,000,000	N.P.	25cQ	12-31-30	69⅛	48½	67⅞	28	55⅞	19⅝
⅜	⅛	200	5/16	5/16	5/16	Magdalena Syndicate	(sh)	850,000	$1	....	.....	1⅞	½	1¼	¼	½	⅛
5	3	100	4	4	4	Margay Oil Corp.		160,000	N.P.	....	7-10-30	48½	32	38½	14	16	3
4¼	1½	300	4¼	3½	4¼	Mexico-Ohio Oil Co.		500,000	N.P.	....	.....	8	2¾	6⅜	2¼	7½	1⅜
½	¼	200	½	½	½	Mountain & Gulf		$4,000,000	$1	1½cQ	1-15-31	1¾	.76	1½	¼	¾	⅜
5⅝	4⅜	100	5⅜	5⅜	5⅜	Mountain Producers		$1,682,182	$10	40cQ	1- 2-31	28⅞	19½	22⅞	7	12⅛	3⅜
1½	1⅛	200	1⅜	1⅜	1⅜	New Bradford Oil		$1,095,291	$5	10cQ	1-15-31	5⅝	4¼	5	2½	3½	1⅛
3	1⅞	100	2⅝	2⅝	2⅝	New Mexico and Arizona		$1,000,000	$1	....	.....	11⅞	7⅛	9⅜	2¼	7¼	1½
3¼	1⅜	500	3⅛	3⅛	3⅛	North Central Texas	(sh)	400,000	N.P.	....	9- 2-30	14¼	8½	18½	6⅛	11¼	2⅛
½	¼	3,800	⅜	⅜	⅜	Pandem	(sh)	489,875	N.P.	....	.....	6	2⅛	3½	½	2½	¼
2	1⅛	1,000	1⅜	1⅝	1⅝	Pantapec Oil	(sh)	1,506,000	N.P.	....	.....	15⅝	8½	10½	1⅞	4⅜	⅞
2½	1¾	100	1¾	1¾	1¾	Red Bank Oil	(sh)	250,000	N.P.	....	.....	18	4⅞	16	9⅝	10⅛	1½
1⅜	1	100	1¼	1¼	1¼	Reiter-Foster	(sh)	388,584	N.P.	....	12- 2-29	12⅞	4⅛	8½	1⅛	5⅜	1
3	2	200	2⅝	2⅝	2⅝	Ryan Consolidated	(sh)	500,000	N.P.	....	.....	12	4⅛	11	3	8⅝	2
1⅜	1¼	100	1¼	1¼	1¼	Salt Creek Consolidated	(sh)	1,286,300	$10	10cQ	1- 2-31	7¼	5½	5⅞	1⅞	2½	½
7¾	6⅛	600	6¾	6½	6½	Salt Creek Producers	(sh)	1,496,859	$10	50c	2- 2-31	35	23⅛	25⅞	9	15¼	5¼
..	..	No sales.				Savoy Oil		$750,000	$5	....	.....	3½	1	2½	⅞	1	½
5¼	2⅜	800	4½	4¼	4¼	Sunray Oil Corp.	(sh)	1,163,185	$5	5%Q‡	1-15-31	..	..	12	5⅝	10	2
1⅝	⅞	100	1	1	1	Venezuelan Petroleum	(sh)	755,090	$5	....	2-15-30	9¼	4¾	6½	1¾	4½	⅜
3½	1½	100	3½	3½	3½	Woodley Petroleum		$500,000	$1	....	3-31-29	8¼	4⅞	9½	2	5	½
⅞	⅜	100	⅝	⅝	⅝	Y Oil & Gas		100,000	N.P.	....	.....	8⅝	2⅛	2⅞	½	2½	⅜

*Including one-half per cent monthly in stock. †Payable monthly and monthly stock dividend of one-half per cent. ‡Paid in lieu of regular cash dividend of 2 per cent. x Ex-dividend.

TRANSACTIONS IN OIL SHARES ON NEW YORK STOCK EXCHANGE

Quotations Compiled by Francis, Bro. & Co., Members of the New York Stock Exchange and Associate Members of New York Curb, Kennedy Building, Tulsa, Okla.

1931 High	1931 Low	Week ended March 4 Sales	High	Low	Close	Stocks—		Outstanding capital	Par value	Div. rate	Last paid	1928 High	1928 Low	1929 High	1929 Low	1930 High	1930 Low
21	17½	1,000	18⅞	18½	18⅞	Amerada Corp.	(sh)	922,075	N.P.	50cQ	1-30-31	43⅞	27⅛	42⅝	17½	31½	16½
12⅜	7	500	11¼	10⅛	10⅛	American Republics Corp.	(sh)	209,180	N.P.	....	.....	85	51⅜	64¾	12½	37	5⅛
31	26	‖20	31	31	31	Associated Oil		$57,260,300	$25	50cQ	12-31-30	53⅜	37½	47¼	34½	51	30
23⅝	18	4,200	20⅝	20¼	20⅛	Atlantic Refining		$66,763,775	$25	25cQ	12-15-30	66⅜	50	77⅞	30	51⅜	16⅝
14½	11¼	2,300	13⅜	13⅛	13⅛	Barnsdall Corp. A		$56,546,600	$25	50cQ	11- 6-30	54	20	49⅛	20	34	8⅝
12	9¼	6,500	10½	10	10¼	Continental Oil of Delaware	(sh)	4,741,554	N.P.	....	.....	..	..	47⅞	18	30½	7¾
45⅛	24¼	1,100	40⅜	39½	40⅜	General Asphalt	(sh)	413,333	N.P.	75cQ	12-15-30	94⅞	68	94¾	42¼	71½	22⅜
68½	35¼	6,500	56½	53½	55½	Houston Oil		$24,968,600	$100	....	.....	167	79	109	26	116⅞	29¼
14¼	8¼	5,800	12	11¼	11½	Houston Oil (new)	(sh)	998,744	$25	....	.....	..	..	..	..	11¾	6⅝
4⅝	3⅝	300	3⅞	3¾	3⅞	Indian Refining		$12,564,070	$10	....	.....	39⅝	9	53	13⅛	17	2
4½	3¾	900	4⅛	4	4	Louisiana Oil Refining	(sh)	1,190,063	N.P.	....	.....	19¾	9⅜	18	7	12	3½
3¾	2⅛	100	2¾	2¾	2¾	Maracaibo Oil	(sh)	330,000	N.P.	....	.....	25½	12½	18½	5½	10⅜	1⅜
19¾	10⅝	13,800	17	15¼	15¾	Mexican Seaboard	(sh)	1,244,383	N.P.	....	10- 1-24	72	45⅜	59⅜	8¼	37	9¾
16¾	12½	3,300	14	13½	14	Mid-Continent Petroleum	(sh)	1,857,912	N.P.	50cQ	2-16-31	44½	25⅛	39⅞	22⅛	32	11
19½	15⅝	4,500	16¼	15⅞	16	Ohio Oil	(sh)	6,648,052	N.P.	25cQ	12-15-30	84	58½	79⅞	64¼	32	16
35⅛	34	300	35	35	35	Pan American P. & T.		$50,084,700	$50	....	12-20-27	50⅞	38¼	69	40½	46½	42
36½	32	300	35	35	35	Pan American P. & T. "B"		$121,110,650	$50	....	12-20-27	59⅞	37¾	69¼	40½	67¼	30
4¼	2⅜	100	3½	3½	3½	Panhandle P. & R.	(sh)	199,370	N.P.	....	.....	21¾	11½	15¼	3	12¾	1¾
..	..	No sales.				Panhandle P. & R. pfd.		$2,564,400	$100	....	.....	108	70	76	47½	80	47½
15⅝	12	17,600	12¾	12	12¼	Phillips Petroleum	(sh)	2,593,075	N.P.	50cQ	1- 2-31	53⅞	35¼	47	24¼	44⅜	11½
1½	⅝	500	1⅛	1	1	Pierce Oil Corp.		$29,622,831	$25	....	.....	5¼	½	3⅜	1	2½	½
3⅜	1⅜	500	2⅜	2¾	2¾	Pierce Petroleum	(sh)	2,500,000	N.P.	10c	2-16-31	7	3½	5⅞	½	7⅛	1⅜
20⅜	12¾	2,700	16½	15¼	16¼	Prairie Oil & Gas		$60,848,000	$25	50cQ	12-31-30	68	46	65⅜	40½	54	11¼
26½	17⅞	3,800	22¼	20⅝	21	Prairie Pipe Line		$101,250,000	$25	75cQ	12-31-30	280	172	65	45	60	16⅝
6	2½	200	5⅞	5½	5⅞	Producers & Refiners		$37,438,950	$50	....	9-15-23	29⅞	16	25⅞	4	11⅞	1
16	11⅞	‖370	15⅞	15⅛	15⅞	Producers & Refiners pfd.		$2,845,350	$50	....	5- 4-25	49⅝	41	46¾	25½	40	11½
11⅞	8¾	1,100	9⅞	9⅝	9⅝	Pure Oil		$75,959,250	$25	....	9- 1-30	31⅝	19	30¾	20	27¼	7⅝
6⅜	2¾	800	4⅝	4½	4½	Richfield Oil		$52,410,875	N.P.	....	.....	56	23	49⅝	20	9¾	4⅛
10¼	5¾	700	7⅞	7⅝	7⅝	Rio Grande Oil	(sh)	1,236,270	N.P.	....	7-25-30	37½	32	42½	15	25⅜	5
42⅝	37¾	800	39	38⅝	39	Royal Dutch, N. Y.	(sh)	611,303	....	$1.3404	1-30-31	64	44⅝	61	43⅛	56½	36⅞
34	30½	200	34	32	32	Shell Transport & Trading Co.		£23,985,000	£1	$0.966	1-23-31	47⅞	41⅜	51½	40⅝	48⅜	26
10¼	7⅜	1,400	8⅞	8¾	8¾	Shell Union Oil	(sh)	13,066,497	N.P.	....	6-30-30	39¼	23¼	31⅜	19	25½	5¼
11	7¼	200	9	9	9	Simms Petroleum		$8,353,620	$10	....	9-15-30	27¼	18⅛	40⅛	15	37	5⅝
15⅞	10⅛	12,700	13⅜	12⅜	13	Sinclair Consolidated	(sh)	5,500,000	N.P.	25cQ	1-15-31	46¾	17⅜	45	21	32	9¾
102¾	95	100	102½	102½	102½	Sinclair Consolidated pfd.		$16,025,250	$100	$2Q	2-14-31	110	102½	111	103	112¼	86
12⅞	8½	1,300	9⅞	9⅜	9⅜	Skelly Oil		$27,441,250	$25	....	12-15-30	42⅝	25	40½	28	42	10⅛
51¾	45¼	3,000	47⅞	47¼	47½	Standard of California	(sh)	12,594,098	N.P.	62½cQ§	12-15-30	80	63	81⅞	51½	75	42¼
19	14⅝	500	16⅜	16⅜	16⅜	Standard of Kansas		$8,000,000	$25	25cQ	12-15-30	37⅜	15	33⅜	18	49	14⅜
52½	45¾	18,700	49	47½	47¾	Standard Oil of New Jersey		$634,999,200	$25	25cQ*	12-15-30	59⅜	37¾	83	49	84⅞	32½
26	22½	5,900	24¾	24	24⅛	Standard Oil of New York		$445,223,675	$25	40cQ	12-15-30	33¼	28¾	48⅛	31¾	40⅜	19⅜
45¼	39½	100	43	43	43	Sun Oil	(sh)	1,416,869	N.P.	25cQ	12-15-30	77	31½	68⅜	55	70	39
1¾	¾	1,800	1½	1½	1½	Superior Oil Corp.	(sh)	776,979	N.P.	....	12-20-30	..	..	24	5¼	9⅜	¾
36¼	30⅛	10,100	33¾	32¾	32⅞	The Texas Corporation		$246,204,900	$25	75cQ	1- 1-30	74¾	50	71⅞	50	60½	28¼
6½	4½	1,300	5⅞	5½	5⅜	Texas Pacific Coal & Oil Co.		$9,304,890	$10	2½%A‡	12-31-29	26⅝	12⅛	23⅞	9½	14½	4
15⅛	10½	100	15⅛	15⅛	15⅛	Tide Water Oil	(sh)	2,191,759	N.P.	20cQ	12-31-30	41½	19⅝	40	14	31	13
83	69¼	100	80	80	80	Tide Water pfd.	(sh)	19,947,000	N.P.	$1.25Q	2-16-31	100⅛	86	97½	85½	94⅞	71
9	6½	100	8	8	8	Tide Water Associated	(sh)	5,566,424	N.P.	30cSA	2-16-31	25	14¾	23½	10	17¾	5⅞
68	55	100	65	65	65	Tide Water Associated pfd.		$73,284,500	....	$1.50Q	1- 2-31	..	..	90⅞	74⅛	89¾	55
26⅝	22	2,700	22⅞	22⅛	22⅜	Union Oil of California		$104,342,375	$25	50cQ	2-10-31	58	42⅜	57	42⅛	50	20⅛
25⅛	23	200	23	23	23	Union Tank Car	(sh)	1,254,048	$100	40cQ	3- 2-31	128½	110	163¾	121⅞	38½	23
7⅜	4¼	400	6⅛	6	6	Warner-Quinlan	(sh)	632,948	N.P.	....	7- 1-30	44⅞	26	42⅞	15	27	4¼
7¼	6½	200	6¾	6¾	6¾	Wilcox Oil & Gas	(sh)	428,907	N.P.	....	5-10-28	..	..	29¾	12⅞	21	6½

*Plus extra dividend of 25 cents. †Plus extra dividend of 50 cents. ‡Payable in stock. §Plus 2 per cent stock dividend. ‖Unit of trading less than 100 shares. x Ex-dividend.

In comparing highs and lows for the several years in the three tables, it will be necessary to take into consideration cases where there have been splits in the stock.

PRESSURE DISTILLATE STABILIZATION DISCUSSED

(Continued from Page 34)

other, and since the condensing pressure in cracking plants is always higher than in crude distillation plants, and the quantity of propane greater, the condensate produced will always contain propane in objectionable quantities even should the condensing temperature be as high as 140°-150° F.

This propane existing in cracked distillates can effectively and economically be removed only by fractionation.

Below is shown a representative fractional analysis on each of four samples of pressure distillate processed at different condensing pressures.

COMPOSITION OF PRESSURE DISTILLATE

Constituent—	Atmospheric pressure Mol. %	30 lbs. Mol. %	40 lbs. Mol. %	165 lbs. Mol. %
Ethene	.33	.02	.06	.47
Propanes	3.40	.24	.69	2.22
Butanes	8.43	1.63	3.22	5.67
Pentanes	10.93	9.39	9.33	10.31
Hexanes and heavier	76.91	13.11	12.05	11.26
A.P.I. gravity	52.6	58.2	55.3	61.3

Two samples of gasoline made direct from cracking units by processing through Gray towers were also fractionated and showed the following composition:

COMPOSITION OF PRESSURE GASOLINES

Pressure gasoline at— Constituent—	20 lbs. Mol. %	40 lbs. Mol. %
Propane	1.91	2.04
Butane	5.67	6.34
Pentane	11.05	10.82
Hexanes and heavier	81.37	80.80
A.P.I. gravity	57.3	55.4

Single Flow Chart

In the stabilization of this pressure distillate there is only one basic flow diagram. It is the modification of that basic flow diagram, to most economically meet the conditions existing at a particular refinery, that makes the preliminary survey so essential. The particular essential items in this survey that pertain to the pressure distillate stabilization are:

1. Quantity, pressure and composition.
2. Is the operation of this stabilization plant to be incorporated with the vapor recovery plant or will it be complete within itself?
3. Steam pressure available, and its value per 1,000 pounds. Cooling water and its value. Electric power and its value.
4. Is there any constant source of hot oil available which may be used as heating medium for reboiler? Temperature, quantity, viscosity and gravity of such oil.
5. Gum content of pressure distillate and effect of temperature on this gum content.
6. Corrosive properties of pressure distillate.
7. Any unusual material specifications which might affect equipment cost.
8. Existing equipment which might be utilized to advantage.

Let us consider Item 2 of the above. The general trend of the industry is to incorporate the pressure distillate stabilizing operation with the vapor recovery plant and final stabilization plant. However, many refineries already have installed their vapor recovery plants, and are now beginning to consider pressure distillate stabilization. In such cases it is generally necessary to remodel the vapor recovery plant. Vapor recovery plants, which were installed before pressure distillation stabilization was considered, were in most cases designed to produce a gasoline similar in character to casinghead gasoline containing approximately 30 to 35 per cent by volume of butanes. It was the proper gasoline for blending at that time. But if we stabilize the cracked distillates, we have removed propane from them, and consequently we can use a gasoline for blending containing considerably more butane than we could if the pressure distillates were not stabilized. For each volume of propane we remove from the pressure distillate, we can replace with approximately 3½ or more volumes of butane, and still have the same vapor pressure on our final product. It is this relation that has made it profitable for the refiner to design his vapor recovery plant for a recovery of 90 per cent of the total butanes in his vapors. In general such a high recovery of total butanes in the vapor recovery plant is not profitable, unless such butanes can be sold separately or can be used to replace propane in pressure distillates and other light distillate streams.

Before we proceed further with this discussion it might be well to define what we mean by stabilization as it applies to pressure distillate. The apparatus used to accomplish this rectification is most generally referred to as a "debutanizer." In fact this word is now used to describe any process of rectifying pressure distillates without particular regard to the purpose of the operation. Originally the purpose of a "debutanizer" was to remove, under control, light fractions, so as to avoid subsequent handling and distillation losses. In some plants this purpose has become secondary to facilitating distillate treatment for color and stability. For the purpose of this paper we define pressure distillation stabilization, as any control process of rectification, which removes essentially all the propane from the pressure distillate without regard to the quality of butane removed.

Question of Gums

All the distillates produced by cracking contain constituents capable of forming gum. One of the known sources of gum is the inter-reaction of unsaturated hydrocarbons. This tendency to form gum is accelerated by reheating the pressure distillate. There is some maximum temperature to which the pressure distillate can be heated without increasing the gum content in the bottom or stabilized product. Thus the stabilizing equipment should be so designed that the reboiling temperature will be below this maximum temperature. The stabilizing process should decrease rather than increase the treating cost.

Many of the cracking plants use Grey towers for treating pressure distillates in the vapor phase. This gasoline is finished with respect to color and perhaps endpoint if an auxiliary fractionating tower is used ahead of Grey tower but very seldom with respect to gravity and vapor pressure. In most cases it will be profitable to stabilize this product for as the analyses included above showed, there is an appreciable quantity of propane present. In studying this Grey tower gasoline it is necessary to determine the maximum temperature to which it can be heated before it begins to show unstability as to color, as well as the maximum temperature without showing increasing tendencies to form gum. The lower temperature of these two will be the deciding factor and in general the reboiling temperature in stabilizing treated pressure distillate is lower than the reboiling temperature in stabilizing untreated pressure distillate.

Other Factors

Now before we proceed with the discussion on the actual process equipment for pressure distillate stabilization, we can include here the additional items necessary in our preliminary survey which have a bearing on the vapor recovery system.

1. Quantity, pressure and composition of gas from each source.
2. Value and characteristics of the various absorption oils available.
3. How will the vapors from your storage tanks be handled. Will you have a vapor return system or will you release air into the tanks when pumping from them?
4. Quantity of hydrogen sulphide present in vapors
5. Effect of compression on corrosive properties of these vapors.
6. Ground space available.
7. Interest and depreciation rates to be used in determining annual operating cost.
8. Probable average load factor on plant.
9. Wage rates of operating personnel.
10. Administrative burden chargeable against plant.
11. Prospects of refinery expansion which may require extension of vapor recovery system.

With all these above facts, and also the facts which were required for the pressure distillate stabilizing plant, the process engineer is now ready to consider available processes.

P. D. Stabilization Plants

A basic flow diagram is presented here. The flow remains essentially the same regardless of the amount of butane and propane overhead. The operating method can be modified in many different ways, to meet the conditions most profitable to your particular refinery such as character of reboiler medium, pressure on column, combination of partial and final condensers but unless more than one overhead and one bottom product are desired, it remains a single column. An exception to this case would be, should your refinery already have a vapor recovery plant operating at low butane recovery from your vapors, and you desire to stabilize your pressure distillate without remodeling your vapor recovery plant for high butane recovery. Then it might be economical to use two columns in the pressure distillate stabilizing unit, taking overhead butane and propane from the first column, compressing this overhead product and fractionating between propane and butane in a smaller high pressure column.

Under the items mentioned in the preliminary survey for the pressure distillate stabilizer, we stated that rectifying the pressure distillate accomplishes two purposes. The original purpose was to remove light fractions so as to avoid subsequent handling and distillation losses, but more recently this purpose has become secondary to facilitating distillate treatment for color and stability. The value of debutanization from this standpoint comes about through obtaining an overhead cut of from 15 to 30 per cent of the total pressure distillate which requires only a sweetening wash. Thus a treating cost of 5 to 10 cents a barrel, and a corresponding loss to acid of from 1 to 2 per cent of the pressure distillate treated, is saved, and at the same time treatment of the remaining distillate is facilitated through ease of handling a stable distillate. This saving in treating cost has added materially to the profits to be derived from pressure distillate stabilization.

It is very difficult to establish the net increased yield obtained through the stabilization of the pressure distillate. By recycling of condenser and tank vapors into the vapor recovery system, many refiners believe that if they do lose it one place, they will get it another place. However, we have found that those refiners who keep an accurate overall record of their various operations, are able to trace a very distinct increase in the net yield which can be directly credited to debutanizing. The various figures we hear vary from 1 to 4 per cent. It is our opinion that this increased yield is not due so much to the reduction of evaporation losses as it is to better utilization of the volatile fractions, for as I have stated before the elimination of a small percentage of propane and lighter makes possible their replacement by 3 to 3½ volumes of butane. Most operators now appreciate the tenacity with which these small percentages of undesirable constituents are held by the pressure distillate throughout the whole of their ordinary refining operations.

Excess Light Fractions

In many instances vapor locking tendency is blamed on low initial boiling point, high gravity, or the use of too much natural gasoline in blending but in most cases, which we have observed, the difficulty is due to an appreciable amount of propane and lighter constituents, which could have been eliminated with a considerable increased yield of finished product, if attention has been given to distillate rectification in the refining process.

After we have made the complete survey of the refinery as outlined in the preceding paragraphs, we are now ready to prepare a preliminary estimate on which can be based comparative costs of the recovery plant for different percentages of gasoline extraction from the gas. The controlling factor in most plants is the butane extraction.

If all the pressure distillate has been debutanized and the recoverable butane can be used, and its value is considered equal to that of heavier constituents, it is usually considered economical to recover at least 90 per cent of the butane in the gas. Occasionally low butane content, low cost of power for pumping oil, low cost of compressing gas, minimum corrosion expense, and other factors so reduce the operating cost that it becomes worth while to recover as high as 95 per cent of the butanes, although such a plant may cost 20 per cent more than a plant for recovering 90 per cent. This cost of extracting high percentages of butane varies widely, depending largely on the percentage of butane in the gas, and its relation to the percentage of pentane and heavier. The percentage of butane extraction becomes one of the most important factors in the determination of oil circulation, absorber pressure, and, in fact all of the plant design.

The next important decision then to be made is what absorption pressure to use. Before making this decision, we must develop the following operating costs:

1. Cost of pumping absorption oil against pressures 30 to 300 pounds gauge.
2. Cost of compressing gas from the available suction pressure to discharge pressures from 15 to 250 pounds gauge.

In studying the two above costs, we must also take into consideration the characteristics of the absorption oils available at your refinery.

With all this information regarding characteristics of absorption oils, and the cost of pumping oil against various pressures, as well as the cost, including initial investment and operating cost, of compressing gas against various pressures, we endeavor to find the economic pressure at which to operate the absorbers of the vapor recovery plant. There is a great diversity of absorber pressures now in use by our largest refineries varying from 15 to 250 pounds. At the very high pressures, which requires two stages of compression, the operating cost of compressing the gas due mainly to aggravated corrosion at the high pressure, makes the total operating cost of the plant higher than if a lower absorber pressure was used with a much greater oil circulation. One large refinery reported recently that the average cost of compressing its gas from atmosphere to 250 pounds, taken over a period of a year, was in excess of 4.5 cents per 1,000 feet. A large part of this cost was expensive replacements and upkeep to his compressor due to corrosion.

The general consensus of opinion, at the present time, regarding absorption pressures, seems to be between 35 and 80 pounds. These pressures fall within the limits of a single-stage compression. For high butane extraction, the tendency is to use pressures between 60 and 80 pounds and for relatively low butane extraction about 35 pounds. A true study of the economics of absorption pressure, will, in general, prove that it is more economical from an operating point to circulate oil than to compress the gas above the pressure attainable with single-stage compression.

After having determined the butane extraction required, absorption pressure, and absorption oil to be used, in conjunction with the other information tabulated, the process engineer can now definitely calculate the oil circulation and proceed to the determination of the distillation process.

Considerable variety can be applied in the method of extracting the gasoline from the oil. If the percentages of methane, ethane and propane in the rich oil are relatively high, it is usually advisable to provide a suitable vent to eliminate as much as possible of this light

material, without serious loss of desired fractions, before the distillation takes place. If these high percentages of so-called fixed gases remained in the oil and flashed in the still, it would necessitate high condenser pressures, or uneconomical reabsorption. High condensor pressures can be obtained only by high still pressure or recompression. Recompression is fundamentally undesirable, if avoidable, as it adds to first cost, operating costs, ground space, and an element of operating fallibility which can be eliminated only by installing a spare recompressor at further added cost. High still pressure, if applied to a single column distillation system, is objectionable because the steam consumption, which varies with distillation pressure becomes excessive and exhaust steam, which is frequently available cannot be used. Consequently it has been the problem of engineers whose main interest is economical operation to modify this distillation equipment so as to accomplish the advantages of high condensation pressures without the disadvantages of high distillation pressures. Especially were they confronted with this problem in distillation, when very high butane recovery was desired, in which case the butane to be condensed most always was greater in quantity than all the heavier gasoline constituents combined.

Use Two Stills

The economical solution of this problem is the use of two stills in series, the first one operated at about 80 pounds and the second one at about 10 pounds. Since complete stripping in the high pressure still is not desired, very little high pressure steam will be required. Only sufficient steam should be used so as to reduce the vapor pressure of the partially stripped oil down to the absolute pressure on the low pressure still. This will insure practically complete condensation in the low pressure condensers of the vapors distilled off in the low pressure still. Since the second still, or low pressure still, is operated at about 10 pounds, it makes possible the use of exhaust steam for stripping purposes. The vent or uncondensed vapors from the high pressure still being at about 80 pounds, frequently correspond closely enough in composition to the rich gas to permit returning them directly to absorber inlet, thereby eliminating separate reabsorbers or recompressors. Since the absorbers pressure in these high butane recovery plants is generally close to 80 pounds, it would be impossible, without recompression, to return these condensers vent vapors direct to the absorber, unless the distillation pressure is slightly in excess of the absorber pressure. The economics of the two-still distillation units is a function of the cost of your high pressure steam, and the higher the cost of your steam, the greater the saving shown.

From an operation standpoint, which in any refinery vapor recovery plant should be the deciding factor, there are two very important considerations. These are: (1) Flexibility in capacity; and (2) positive automatic control. Extreme and rapid variation in rates, due to starting up or shutting down of various units, are characteristic of refinery operations, and a vapor recovery plant to give satisfactory operation must be able to smooth out these variations as well as handle gases and vapors of widely different characteristics.

Design of Equipment

In the design of refinery vapor recovery plants, much greater attention must be paid to refinements than is usually considered justified for field plants. Corrosion is frequently severe in the refinery, which makes it advisable to design all equipment for convenient accessibility and replacement of attached parts. Since this equipment can be counted on to remain in useful operation over a relatively long period compared with field equipment, the relatively small increase in first cost to make the interiors of all equipment accessible, is easily justified. Bubble towers should either have removable plates packed into shells, or should be provided liberally with manholes for access to plates. At the temperatures encountered in vapor recovery plants, the warping of steel bubble plates, if of adequate thickness, is negligible so either steel or cast iron plates will serve equally well, except cast iron is less susceptible to corrosion. Good practice seems to be to use cast iron in the construction of bubble caps, throats, seals and downpipes.

Some engineers have laid much stress on the design of the bubble plates itself. Provided the essentials of good plate design are adhered to, such as ample downpipe capacity, with especially ample weir length or overflow periphery particularly in absorbers, the difference in design becomes a secondary consideration to the number and spacing of plates. Most any of the properly designed bubble plates of today have an efficiency greater than 50 per cent as compared to the theoretical plate. The greatest folly committed in the design of absorption plants, by equipment manufacturers and refinery engineers, has been skimping on the number of plates in absorbers, stills and fractionating columns.

In absorbers especially, this skimping of number of plates, adds to both the first cost and the operating cost of the plant. An insufficient number of plates necessitates the circulation of excess oil, resulting in absorption of increased amounts of fixed gases. The perfect absorber would be one which absorbed only the hydrocarbons desired, and the greater the number of plates the more nearly we approach true selective absorption.

The absorption of excessive amounts of fixed gases, due to excessive oil rates introduces a train of harmful conditions including:

1. Increased pressure drop through the heat exchange equipment.
2. Reduction of transfer rate and partial pressure of gasoline constituents in condensers.
3. Increased load on recompressor or reabsorber. The additional oil circulation increases:
   1. Cost of all distillation unit equipment.
   2. Cost of pumping oil.
   3. Cost of steam for stripping oil.
   4. Cost of cooling water for cooling oil and condensing the additional steam.

Compared with all these additional costs, the expense of additional plates in the absorbers is negligible.

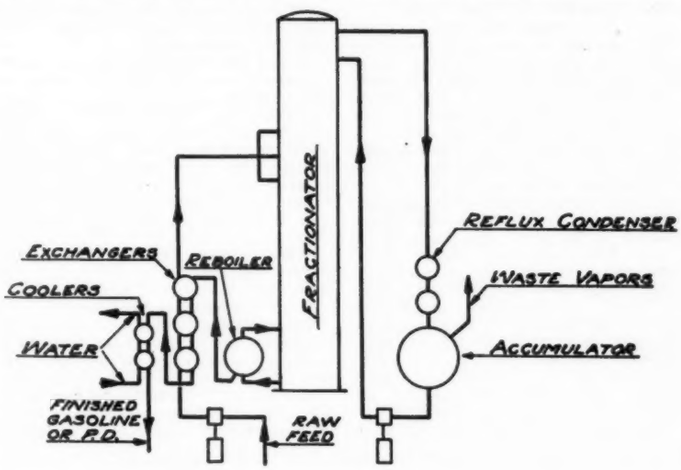
In most vapor recovery plants the percentage of butane extraction is the deciding factor in determining the number of plates required. If 50 per cent or less butane extraction is desired, it is not considered good practice to use less than 16 plates. For 80 to 90 per cent butane extraction, the absorber should have at least 24 plates and several excellent refining engineers believe that as many as 30 plates are justified.

The temperature which controls the amount of oil circulated in an absorber is the rich oil outlet temperature. This can be reduced in two ways, either by decreasing the temperature of the lean oil to the absorber or by intercooling in the absorber or by both. When accomplishing high butane extraction at 60 pounds or higher this oil temperature rise through the absorber may be 30 to 40° F. In this case it is generally economical to apply intercooling in the absorber. By maintaining a relatively low temperature throughout the tower, the partial pressure of the butane in the rich oil is kept relatively low. This same low partial pressure of butane could be achieved without intercooling only by the circulation of additional oil. In some cases, intercooling may result in a saving of 25 to 30 per cent in the oil circulation.

Discuss Absorber

The absorber is one of the most important pieces of equipment in the vapor recovery plant, but no matter how perfect it may be, and no matter how much oil is circulated, efficient extraction of the gasoline from the gas is impossible, unless the rich oil is thoroughly stripped in an efficient still. The still is the heart of the recovery plant. Insufficient stripping plates will necessitate the use of excessive direct steam. Good practice indicates that the still should have at least eight stripping plates. The inlet oil temperature should be within 20° to 40° of the temperature of the available heating steam. The temperature of the partially stripped oil near the base of the still is of greater importance than the inlet oil temperature, as it is this temperature at the base where the extraction of heavy gasoline ends takes place which controls the quantity of direct steam used. If the quantity of gasoline in the rich oil is high in percentage, as is generally the case, when operating the vapor recovery plant for high butane extraction the temperature drop in the oil in passing through the still is considerable, and it should be reheated before reaching the bottom plates. As the only purpose in reheating is to reduce the quantity of steam required for stripping the heavy ends, it is obvious that the oil should be reheated after the temperature lowering due to distillation of the light ends, but before final contact with the steam. This is best accomplished by locating the reheater well down the column, but above at least two or three of the final stripping plates. The use of internal heaters is not recommended, as these heating surfaces may require inspection, cleaning or replacement due to corrosion. With an internal heater, such work will require a plant shutdown. An outside heater can be by-passed with only temporary reduction of economy due to increased direct steam while the heater is being by-passed.

The rectifying part of the still should be directly above the stripping plates, and should be built into the same tower. This rectifying section is of great importance, particularly if light absorption oil is used. The rectifying plates should be ample to insure returning all the evaporated absorption oil to the still with a minimum of gasoline. Good practice calls for eight rectifying plates with at least one water draw-off plate. Endpoint control can be accomplished in three ways: (1) Pumping back gasoline; (2) pumping pure water operating on a closed system, or (3) the use of reflux condensers. Either of these three methods will provide control of the endpoint, but most of the refining engineers today prefer the pumping back of gasoline.



TYPICAL DEBUTANIZER OR GASOLINE FRACTIONATOR

Cooling Equipment

The absorption oil coolers are especially important and should be designed to cool the oil to within 5° to 6° of the temperature of the circulating water. A 1° temperature reduction in the absorption oil to the absorbers effects a saving of approximately 2 per cent in oil circulation.

Either open or closed cooling systems can be used, and both give excellent results. The open system is generally preferable if the circulating water contains an appreciable quantity of depositing solids. Closed coolers are more compact, and generally are more convenient to install.

In any cooling system by-passes should be installed to permit the cleaning of any individual cooler without shutting down the plant. The inside of the tubes on closed coolers should be accessible without breaking any pipe connections.

If the vapor recovery plant has been designed for high butane recovery, which high butane recovery has consequently increased both first cost and operating cost, the final fractionating unit must necessarily be designed for close separation between propane and butane. The important considerations entering into the design of this unit are:

1. Flexibility in capacity and quality of feed. This fractionating unit in a refinery is required to operate satisfactorily under heavy loads in summer, light loads in winter, and a great variety of other conditions brought about by varying the quantity and quality of gas to the recovery plant.
2. Design of column for sufficiently high operating conditions. This column must withstand sufficient pressure to insure the condensation of propane under the worst operating conditions. With operating temperatures such as prevail during the summer, columns are usually operated between 200 and 225 pounds per square inch gauge, but they should be designed for safe operation at 250 pounds should the raw feed be relatively high in ethane and methane.
3. Ample number of fractionating plates. Thirty plates should be the minimum number for close separation and in some instances 40 plates are justified. A great number of plates adds considerable flexibility to the unit.
4. Ample reflux condenser surface. The amount of reflux to the top plate for separation between butane and propane should never be less in quantity than the feed, and if the overhead is great, and the cut desired very sharp the reflux required may be twice this quantity. Reflux condensers are generally located near the ground, the reflux being collected in an accumulator and pumped back to the top of the column. If a rate of flow controller is used, this system provides for very accurate control.
5. Ample reboiler surface. This reboiler should have sufficient surface to reevaporate all the reflux plus the evaporation of the overhead product. Also ample disengaging surface should be provided so that the generation of vapors will proceed without surges.
6. Full automatic control. This may add materially to the first cost but it pays dividends many times in assuring constant and efficient operation.

DR. WALTER CROSS ILL

Dr. Walter Cross, one of the original developers of the Cross cracking process, is seriously ill at Phoenix, Ariz. With his brother, Dr. Roy Cross, of Kansas City, Mo., Doctor Cross began his investigations in the production of gasoline from residua in the pioneering days of cracking.

GENERAL GEOLOGY OF EASTERN TEXAS

(Continued from Page 32)

mation varies greatly. Occasionally there is a well developed conglomerate at the base of the Reklaw.

The Queen City varies in thickness from nothing, where it pinches out in eastern Nacogdoches County to approximately 500 feet in the center of the basin in Cherokee County. It thins to about 100 feet in central and eastern Cass County. The Queen City is composed of sands, sandy clays and shales with some lignite and lignitic shale. The Omen member is to be found near the middle part of the formation. It is very doubtful if the so-called Omen member of the formation is of any importance as a distinct part of the Queen City. It is more likely to be a series of ferruginous sandstone lenses varying in stratigraphic position from the upper to the lower part of the Queen City and depending for their present characteristic hardness and resistance to erosion upon previous ground water conditions through which agency they were furnished with a ferruginous cement.

Weches Greensand

The Weches greensand which overlies the Queen City is the most striking formation exposed in the area, as well as the most important and trustworthy one from the standpoint of surface structural work. In fact, the upper part of the formation is the only key bed available in the area for detailed and exact surface work. The contact with the Queen City is not always readily discernible. However, there is quite occasionally a ferruginous conglomerate in the lower Weches at the contact. The lower part of the Weches is composed of glauconitic sand and sandy clay. At the center of the formation there is a greensand bed approximately 3 feet thick. The top bed of the Weches is a hematite and limonite bed from 4 to 6 feet thick. This bed is the commercial iron ore of East Texas and except for the fact that much treacherous slumping is found is almost a perfect key bed. The bed resists ersion so effectively that in certain parts of Upshur, Cass and Marion Counties, the Weches capped hills tower 200 feet above the stream beds.

Over much of the area of its outcrop in East Texas the Weches is highly fossiliferous, but the writer has been unable to find a significant fauna in the formation along the eastern rim of the basin. The line between the Mount Selman and the Cook Mountain is drawn at the top of the Weches.

The Sparta sand is the youngest bed exposed along the eastern rim of the basin with the exception of the recent flood-plain deposit. It is composed of a loose white sand which at the contact with the Weches is occasionally cemented with limonite. When such is the case, it is not difficult to confuse the lower part of the Sparta with the top bed of the Weches. Such error can be avoided by keeping in mind that the upper Weches is almost pure iron ore while the Sparta, which, when indurated by secondary iron, is as hard as the Weches, is primarily a ferruginous sandstone.

Since they do not occur in the area it will not be necessary to describe the remainder of the Cook Mountain beds.

Subsurface Stratigraphy

With the exception of the lower Wilcox beds, a well in the area started in that formation would encounter only one other Eocene formation before entering the Cretaceous series. The Midway lies directly below the Wilcox. The formation consists of about 500 feet of gray shales and clays with some sand. After penetrating to the base of the Midway the drill encounters the Cretaceous beds, a brief description of which follows.

Gulf Series of Upper Cretaceous

The Navarro group is the uppermost part of the Cretaceous system found in the area. The Nacatoch sand, which ranges in thickness from 150 to 300 feet, is of middle Navarro age, and is the only formation of the group commonly identified in East Texas nomenclature. In Arkansas and Louisiana the group is divided into the Arkadelphia, a gray, calcareous clay; the Nacatoch, a light sand with about 100 feet of light sandy shale at the base; and the Saratoga, a white chalk. The Navarro is from 450 to 500 feet in thickness.

The most outstanding member of the Taylor is the Pecan Gap chalk. This bed is extensively used as a key bed for subsurface contouring. It correlates with the Annona chalk. Drillers' logs, in most cases, include the Saratoga chalk and the Marlbrook marl in "the chalk." The calcareous phase represented by the three formations is approximately 500 feet thick in the area. The Wolfe City sand, when present in the section, is near the base of the Taylor. The group is approximately 800 feet thick.

Austin Chalk

The "Austin chalk" commonly referred to in logs of wells drilled in the area is a hard chalk bed in the middle of upper part of the group. The Blossom sand is at or near the top of the Austin. The upper part of the group is equivalent to the Tokio formation of Arkansas and Louisiana, while the Woodbine formation is either in the lower part of the Austin or is a group in itself, resting directly below the Austin. The Austin group, as such, is from 200 to 600 feet thick.

Eagle Ford

It is the consensus of opinion that no Eagle Ford is present in the area. However, wells some distance down the flank of the Sabine Uplift core a shale which bears a remarkable resemblance to true Eagle Ford. The writer is not at all certain that some Eagle Ford is not present in some wells in the area. The bed referred to may be Bonham clay.

Comanche Series or Lower Cretaceous

The two groups are not readily differentiated in the area. The Lower Cretaceous limestone first encountered in wells drilled in the area is commonly called Georgetown lime of Washita age, but it may as well be some other formation of the group. In some parts of the area, deep tests, for all practical purposes, miss the Washita and Fredericksburg and go from Gulf into Upper Trinity, while others find as much as 300 feet of the two groups combined.

The Trinity is divided into the Glen Rose with a thickness of from 1,000 feet to 1,600 feet at the top and the Lower Trinity at the base, composed of a series of red sands and shales from 1,500 to 2,000 feet thick. The Glen Rose is made up of gray sands and shales with a central anhydrite member which in some cases attains a thickness of 500 feet.

Structural Geology

The surface structure from a regional standpoint does not conform very consistently with the subsurface structure. Regional dip at the surface is apt to be confusing. As an example, the normal surface dip in southern Morris County apparently is well developed in a southeasterly direction.

Local surface structural work on the part of most geologists consists of detail and aneroid work on the upper Weches, and, locally, on formational contacts; and detailed areal work. There are radical differences of opinion as to the stratigraphic position of contacts, but on the whole the areal work is rather satisfactory. On the other hand, considerable areas of reworked material are to be encountered, and, as a result, areal work must be conducted with the utmost care. Some aneroid work is necessary in conjunction with areal work in order to prevent confusing topographic swings with structural displacement.

It has been observed that the major streams in the area have a tendency to slip down, dip and curve around reversal of normal dip. This cannot be accepted as a general rule but abrupt and irrational river bends justify careful investigation. Also, in many cases, peculiarly abrupt topographic highs tend to be structurally high. "Creekology" may yet come into its own in the present East Texas play.

Where surface structure reflects subsurface folding it is probable that the structure is accentuated downward.

Subsurface Structure

Except in highly developed areas it is impossible to do subsurface structural work on a contour scale of less than 100 feet. As a result, any significant flattening should be investigated carefully. The present drilling campaign will be of immeasurable value to those geologists who are studying the area intensively and no doubt a number of new oil pools will be the result of the information gained from the wells now being drilled.

Space will not permit a detailed discussion of the subsurface structure of local areas. Figure 3 shows a diagrammatic section across the east side of the basin. The section is purely schematic and is not intended to represent anything other than the general condition.

The areas of interior salt domes and faulting are shown in Figure 1.

Shore Lines

One of the most common terms used in discussing the geology of the west flank of the Sabine Uplift is "shore line." Apparently there is some confusion as to the exact meaning of the term and certainly many thousands of dollars are being spent in search of it. The much sought after line is the ancient beach of the sea which deposited the Woodbine sand. Much drilling will be necessary before its exact location will be known. One thing is certain: it will be as irregular and sinuous as are many modern shore lines, it will not always be a producing sand and thousands of dollars will be lost and made in the search which is now under way.

It will be well for those working the area to keep in mind a sound principle of textbook geology: the theoretical sedimentary cycle. At the shore line of an encroaching sea, sand is deposited. Seaward from the shore where the water is more quiet and after the heavier material has been dropped, shales and clays are deposited. Still farther out limestone is formed.

As this process progresses landward with the advance of the sea, sand is deposited on the ocean floor, shale is deposited over the sand and in turn limestone is deposited over the shale. As the sea recedes the reverse process takes place and the retreating sea leaves behind a stratum of sand.

Figure 2 represents four successive sea-level stages and consequently four different sets of shore-line conditions. The reader is advised to color the different formations in the figure in order to clarify the picture. The initial shore line is at A. The sea advances to B and, as it does so, sand is deposited on the floor and the areas of shale and limestone deposition move forward with the shore line. After a period of deposition with the sea level at B, the sea retreats to C and the process is reversed and the "C" sand is laid down over "B" shale and "C" shale rests on "B" limestone. While the sea is at the lowest level of "C," erosion of the exposed surface takes place and, as a result, we have the unconformity shown between the beds of "C" and "D" age. As the sea advances again to "D," sand, shale and limestone are again deposited in their successively advancing position. This condition is known as progressive overlap, while the reverse is called regressive or recessive overlap.

If the conditions of sedimentation fitted the theory perfectly all sands would be joined at successive points along the ocean floor. It is doubtful if conditions have ever prevailed which would allow a perfect sequence. Figure 3 probably is a better representation of actual conditions.

The numbers at the top of the figure represent wells drilled through the various sands. Well No. 1 encounters the down-dip ends of sand lenses "A," "B" and "C," all below the water level. Sand "B" is a "stray" sand which in correlating well logs can easily be confused with the "B" sand. Well No. 2 encountered the "C" sand and the "A" sand structurally high enough to produce but not on the shore line and was drilled a little too far east to catch the up-dip or shore-line edge of sand "B" which will produce at its shore line. Well No. 3 found no shore lines or structure and is a water well in all sands found. Well No. 4 also found "C" and "A" sands high and productive. The "A" sand, yielding water, would have been encountered if the well had been a bit farther east. Well No. 5 was below the water level in all sands drilled in the younger beds but was a producer in the deep sand from a structure which antedates the deposition of the younger strata. Wells 6, 7 and 8 are

GAS FROM WEST TEXAS DEEP WELLS TO BE USED BY ELECTRIC COMPANY

Gas that has passed through the natural gasoline plants in the Big Lake Field, Reagan County, Texas, is to be delivered to the new gas line that will convey it to San Angelo and Girvin, Tex., where it will be delivered to the plants of the West Texas Utilities Co.

This gas is being produced from the 8,500-foot wells of that field and has a very low sulphur content. It has been acquired by the Texas Public Service Co., of Austin, Tex., a subsidiary of G. L. Ohrstrom Co., New York City. This company already operates an 8-inch line into San Angelo from the Coleman County fields and this service will be continued and the gas used for domestic purposes because the gas delivered by the new lines will all be utilized by the power plants of the West Texas Utilities Co.

The lines now being built will be 12-inch diameter from Big Lake to San Angelo and 8-inch diameter from Big Lake west to Girvin, located on the Pecos River. It is estimated that the 12-inch line will have a capacity in excess of 20,000,000 feet per day at 300 pounds working pressure at intake and 100 pounds at discharge, while the line to Girvin will handle approximately 12,000,000 feet daily.

The gas is being taken from the gasoline plants of the Big Lake Oil Co. and the Group No. 1 Corp. (Continental Oil Co.) in about equal quantities and this will give an outlet for a considerable portion of the gas produced with the oil under the new system of producing these wells put into effect since the wells were tubed.

The contract for the 78 miles of 12-inch pipe to be used between Big Lake and San Angelo has been let to the National Tube Co. and shipment was reported as starting March 3 and it is estimated that the line will be completed and in operation in about 60 days from March 14.

The line from Big Lake to Girvin will be 40 miles of 8-inch National pipe and the whole is to be laid with Dresser couplings. In addition to this main pipe line there will be 5 miles of 8-inch gathering lines in the field constructed with Naylor spiral pipe.

Order has been placed to wrap 15 miles of the 12-inch pipe and part of the 8-inch pipe at the mill. This pipe is to be laid in soil that appears to be particularly corrosive. The balance of the pipe is to have a cold coat of Barrett coating applied at the mill. All pipe will be laid in ditches with 24-inch coverage. Ditching will be done with ditching machines except for about 7 miles that is through rock and must be blasted.

This line is being laid by the Natural Gas Engineering Corp., of which company R. W. Hendee of Tulsa is vice president in charge of operations. This company is a subsidiary of the Trojan Engineering Co. of New York City and is actively engaged in contracting pipe line work in many parts of the country. The work on this Texas line is under the direction of W. G. Van Arsdale.

The West Texas Utilities Co. operates large electric power plants at Abilene, San Angelo and Girvin, Tex., and distributes power to the various oil fields in the Permian Basin as well as serving the towns and cities of that section with electric power for domestic and industrial purposes.

in the same general area. No. 6 owes its "D" sand production to structure as well as shore-line conditions. The "A" sand accumulation is due to shore-line conditions alone. No. 7 had two shore-line pays, while No. 8 missed the "C" sand but was productive in the "D" shore line.

By Figures 2 and 3 and the discussion, the writer hopes to convey the opinion that the sand horizons now producing along the eastern rim of the basin are not necessarily of the same age; that probably there are numerous sand lenses in the Woodbine and Tokio formations as well as the Blossom and Nacatoch and various "stray" sands; that each sand found presents its own peculiar set of shore-line conditions and that there will be production along the east rim which is due to structure alone, to shore-line conditions alone and to a combination of the two.

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EAST CENTRAL TEXAS

(Continued from Page 65)

ble Oil & Refining Co. from Ed. W. Bateman. One hundred thousand barrels of oil was the reputed price paid for this acreage.

Many different kinds of deals are being made on acreage in the three producing areas, many of the companies now owning leases turning a half interest in their acreage to other companies, while some of the acreage is being pooled for tests, and two tests are to be drilled on unitized blocks.

Gregg and Rusk Counties are now producing around 80,000 bbls. per day, the fields producing their first million barrels this week since discovery. The railroads are handling the present output, and will be able to handle about 70,000 bbls. per day more. About the time they become overloaded there will be major pipe line company laterals to the fields to give them assistance in handling the oil, and it will be interesting to see just how much oil will be produced and moved from the three fields at that time.

No water is showing in the Arkansas Fuel Oil Co., Farrell and others' No. 1 Lathrop discovery, and the 130° temperature which showed on a test about 10 days ago has lost much of its threat, the petroleum engineers being at a loss to know just what causes this high temperature.

Word came out of New York last week that the Sinclair Pipe Line Co. would lay a 12-inch trunk line from the Joiner Field in Rusk County to connect with its trunk line in Oklahoma, covering a distance of around 265 miles, but it seems hardly believable that the company would lay this line instead of running it to Houston as many have expected the company to do. However, no word has been stated in regard to such a line to the Gulf Coast. It does seem that the company may be meditating on some form of main outlet and will perhaps make such announcement in a short time. The line out of the field to Oklahoma would carry the oil to refineries in the north and to storage which has been erected by the company for handling a large amount of crude.

Another dry hole was chalked up for the Carroll district of the Van Field, Van Zandt County, this week. This is Pure Oil Co.'s No. 1 Blackstock in the John Walling Survey. Total depth of this test is 2,990 feet. It is about 1,250 feet east of production on the company's Shirley lease, and precludes possibilities of oil recovery in this direction. It is the fourth dry hole marker in the eastern side of the field.

EAST CENTRAL TEXAS PRODUCTION

Boggy Creek	2,625
Cedar Creek	25
Currie	280
Hill County	30
Mexia	3,692
Nigger Creek	170
Powell	4,810
Richland	100
Rusk and Gregg Counties—	
Joiner district	24,376
Kilgore and Lathrop	22,370
Van	30,315
Wortham	550
Total	89,343
Week ended February 28	75,966
Increase	13,377

COMPLETIONS IN EAST CENTRAL TEXAS

Harrison County

Sam Hunter's No. 20 Daugherty, dry and abandoned, total depth 3,592 feet.

Navarro County

Priest and others' No. 1 H. L. Albrighten, dry and abandoned, total depth 3,227 feet.

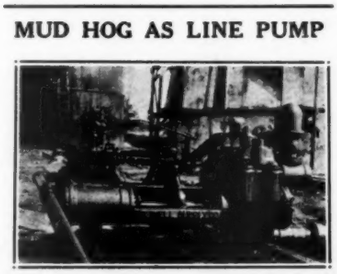
Rusk County

Anderson and others' No. 1 G. T. Moore, location abandoned. Roy I. Carter's No. 1 Mayfield-Alford, oil sand 3,604-17-38 and 40 feet, initial production 1,320 bbls., total depth 3,640 feet. Haynes Drilling Co.'s No. 2 Brown, cored oil sand 3,671-88 feet, initial production 4,000 bbls., total depth 3,688 feet. Humble Oil & Refining Co.'s No. 2 Lou Della Crim, oil sand 3,699-3,724 feet, initial production 8,095 bbls. in 24 hours, total depth 3,724 feet. H. L. Hunt's No. 3 Ashby, hard oil sand 3,591-3,603 feet, initial production 500 bbls., total depth 3,625 feet. H. L. Hunt's No. 4 Ashby, oil sand 3,602-11 feet, initial production 550 bbls., total depth 3,624 feet. E. M. Jones and others' No. 1 Mrs. W. R. Crim, oil sand 3,675-95 feet, initial production 10,991 bbls. in 24 hours, total depth 3,695 feet. John W. Olvey's No. 1 W. R. Crim, oil sand 3,688-94 feet, initial production 480 bbls. first 12 hours, on twenty-two-twenty-fourths-inch choke, total depth 3,709 feet. E. R. Tennant's No. 1 Daisy Bradford, oil sand 3,595-3,613 feet, initial production 1,312 bbls., total depth 3,629 feet. Sinclair Oil & Gas Co.'s No. 2 Holland, cored oil sand 3,623-48 feet and 3,660-61-95 feet, initial production 1,937 bbls., total depth 3,695 feet. Tidal Oil Co.'s No. 1 Holland, oil sand 3,633-41-57-63-73 feet, initial production 2,472 bbls., total depth 3,686 feet. Henry Smith and others' No. 1 D. M. Peterson, top oil sand 3,688 feet, initial production 6,634 bbls. in 24 hours, total depth 3,698 feet.

Van Zandt County

Cranfill and Germany's No. 1 O. L. and L. L. Swain, temporarily abandoned, total depth 1,167 feet. Pure Oil Co.'s No. 2 R. E. Cade, initial production 72 bbls. on eleven-sixteenths-inch choke, total depth 2,957 feet. Pure Oil Co.'s No. 4 F. B. Smith, initial production 120 bbls. on eleven-sixteenths-inch choke, total depth 2,928 feet.

MUD HOG AS LINE PUMP



A mud hog being used as a pump on the Petroleum Marketing Corp.'s 6-inch line from the Joiner Field to its loading rack at Friar Switch on the I.&G.N. Railroad, a distance of 3 miles.

NORTH AND WEST TEXAS

(Continued from Page 68)

production 35 bbls., total depth 895 feet. C. A. Normet's No. 1 Parrish, dry and abandoned, total depth 1,205 feet. E. R. Rigg's No. 117 Larimore, oil sand 695-707 feet, initial production 255 bbls., total depth 708 feet. J. R. Warson and others' No. 1 Morris, dry and abandoned, total depth 710 feet. Grubbs and others' No. 2 Weaver, dry and abandoned, total depth 422 feet. E. C. Stovall's No. 13 Stovall, temporarily abandoned, total depth 3,963 feet. Texotus Exploration Co.'s No. 1 Mathis, temporarily abandoned, total depth 250 feet.

COMPLETIONS IN RANGER DISTRICT

Brown County

Warren and others' No. 1 Newton, oil sand 1,247-49 feet, initial production 25 bbls., total depth 1,249 feet. Bush and Robert's No. 2 Richardson, temporarily abandoned, total depth 650 feet. Hynes and Engle's No. 2 Leach, initial production 1,400,000 feet of gas, total depth 1,141 feet. Mystel and others' No. 2 Guyer, temporarily abandoned, total depth 1,103 feet.

Coleman County

Arcadia Refining Co. and others' No. 2 Golson, oil sand 1,602 feet, initial production 150 bbls., total depth 1,602 feet. Arcadia Refining Co. and others' No. 3 Golson, oil sand 1,573-84 feet, initial production 157 bbls., total depth 1,584 feet. Capitol City Oil & Gas Corp.'s No. 1 Hubbarel, temporarily abandoned, total depth 3,622 feet. Jackson and others' No. 1 Henderson, dry and abandoned, total depth 570 feet. Kelley and others' No. 1 Long, temporarily abandoned, total depth 1,790 feet. McGahey and others' No. 1 Overall, dry and abandoned, total depth 912 feet.

Eastland County

Wilkins and Edward's No. 1 Harrell, total depth 1,447 feet, plugged back to 1,445 feet, gas sand 1,434-47 feet, initial production 250,000 feet of gas, with 450 pounds rock pressure. B. & E. Trucking Co.'s No. 1 Stubblefield, gas sand 3,147-54 feet, initial production 350,000 feet of gas, total depth 3,154 feet.

Erath County

Peters and others' No. 1 Smith, dry and abandoned, total depth 3,375 feet.

Palo Pinto County

Wicken and others' No. 1 Heath, dry and abandoned, total depth 3,338 feet.

Shackelford County

Goodrun and others' No. 1 Ackers, dry and abandoned, total depth 1,853 feet.

COMPLETIONS IN WEST TEXAS

Crane County

C. C. Duffey's No. 1 Gulf-Cowden, dry and abandoned, total depth 2,575 feet.

Howard County

Lewis and Slagel and others' No. 1 Bell, top pay 2,494 feet, shot with 450 quarts at 2,520-93 feet, and with 200 quarts at 2,460-2,561 feet, initial production 60 bbls. per day swabbing, total depth 2,827 feet.

Loving County

Martin and others' No. 1 Wheat and Ramsey, top pay 4,178 feet, shot with 180 quarts at 4,178-4,217 feet, total depth 4,218 feet, plugged back to 4,217 feet, initial production 700 bbls. per day.

Pecos County

Corbett Oil Co.'s No. 3 Tippett, top pay 500 feet, initial production 150 bbls. per day pumping, total depth 514 feet. Humble Oil & Refining Co.'s No. 1 Kokernot, dry and abandoned, total depth 6,170 feet, this well was junked, unable to clean up difficult fishing job. J. D. O'Mara's No. 1 Bennett, top pay 1,118 feet, total depth 1,230 feet, plugged back to 1,148 feet, shot with 20 quarts at 1,118-28 feet, initial production 20 bbls. per day.

Winkler County

Magnolia Petroleum Co.'s No. 1 Brashara, top pay 3,091 feet, initial production 9 bbls. per day on pump, total depth 3,109 feet.

Jones County

Shaheen and Prairie Oil & Gas Co.'s No. 1 King, oil sand 1,994-2,006 feet, initial production 64 bbls. first 24 hours, total depth 2,006 feet. Union Oil Co. and Shaheen's No. 1 King, dry and abandoned, total depth 2,187 feet.

WEST TEXAS PRODUCTION
Week Ending March 7

County—	No. wells	Bbls.
Andrews	3	121
Crane	374	19,247
Crockett	50	1,679
Ector	77	5,473
Fisher	10	703
Garza	...	26
Howard-Glasscock	537	25,451
Irion	7	66
Jones	77	1,222
Loving	38	3,380
Mitchell	111	1,843
Pecos	534	94,343
Reagan	255	29,515
Runnels	5	8
Scurry	5	5
Upton	257	5,320
Taylor	3	119
Ward	52	3,350
Winkler	594	50,510
Total production this week		242,381
Total production last week		245,353
Decrease		2,972

RUNS THROUGH TRUNK LINES

Company, size, location—	Bbls.
Atlantic, 10-inch, Houston	25,635
Gulf, 10-inch, Ranger	28,878
Humble, 2 and 8-inch, San Angelo	36,598
Humble, 10 and 12-inch, Comyn	42,963
Illinois, 2 and 8-inch, Del Rio	35,943
Magnolia, 8-inch, De Leon	26,420
Pasotex, 8-inch, El Paso	13,085
Shell, 10-inch, Healdton	27,636
Shell, 10-inch, Houston	29,854
Texas, 12-inch, Houston	31,144
Total	298,156

RUNS TO WEST TEXAS REFINERIES

	Bbls.
Big Spring Ref. Co., Big Spring	1,304
Burford, Pecos	3,382
Cosden Ref. Co., Big Spring	6,970
Col-Tex Ref. Co., Colorado	5,983
Humble Oil & Ref. Co., McCamey	None
Great Western Ref. Co., Big Spring	1,376
Wickett Ref. Co., Wickett	306
Total	19,321

TANK CAR SHIPMENTS

	Bbls.
Big Lake from Texon	3,000
Fox & Thorsen from Mertzon	65
Southern C. O. Pur Co. from Wickett	13,020
Total	16,085
Total daily average distribution	333,562
Total daily average production	279,785
Daily average from storage	53,777

NOTICE

To Buyers and Sellers

The Classified Pages Are

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TEN THOUSAND-FOOT WELL IS IN SIGHT

(Continued from Page 33)

Semitropic area of Kern County, down below the 9,700-foot level. The previous record holder was No. 1 Mascot, a deep test of the Standard Oil Co. in the Midway-Sunset Field of Kern County, which was bottomed at 9,629 feet before drilling was suspended. This well was never abandoned, however, and may ultimately recover the record for depth at some future date when drilling operations are resumed. There are a number of other deep tests under way in California at the present time, some of which may become of prime importance. These include the Shell's No. 7 Manuel in the Dominguez Field at 8,922 feet; Prairie Oil & Gas Co.'s No. 1 Sexton, a wildcat east of the Ventura Avenue Field, at 8,750 feet; Continental Oil Co.'s No. 24 Selover in the Seal Beach Field at 8,600 feet; Standard's No. 1 Bastanchury in the Coyote Field at 7,900 feet, and the Shell's No. 1 Porter Day in the Weed Patch Field of Kern County at 7,400 feet. All of these projects are still actively drilling and will consequently make additional footage before drilling operations are concluded. This is especially true of a number of wells which have not yet reached the 8,000-foot level. The next 10 years will undoubtedly witness a tremendous increase in efficiency of operation both with regards to drilling and production activities. The 10,000-foot level, which has not yet been reached but is expected to be attained in the Shell's Semitropic wildcat in the near future, was not thought feasible 10 years ago. A decade hence, 10,000-foot holes may be a common occurrence instead of a novelty, who knows? From a geological standpoint, there appears to be a definite limitation on the depth to which wells may be drilled, but on the other hand, advances in the science of geology may change this limitation. A well drilled in the Fullerton, or Brea Olinda Field of Los Angeles Basin, starting in the Puente formation, reached a depth equivalent to 15,000 feet in the Long Beach Field from a geological standpoint. This might tend to indicate the absence of commercial production in the latter area below present production, but this will not be definitely determined until disproven by actual drilling as there is always the possibility of an unconformity in subsurface formations. Production equipment has failed to keep step with the advances made in the art of drilling. This may perhaps be due to the chronic overproduction situation which has existed during the past several years. When crude oil reaches the stage that it commands a premium, this may result in the perfection of improved production equipment. A few years ago it was thought impossible to pump 6,000-foot wells but present equipment is capable of lifting crude from depths considerably below this point. Deeper drilling during the course of the next several years will make it necessary for equipment manufacturers to continue an aggressive and progressive attitude especially with respect to drilling equipment. Subsequently, when crude oil drops below requirements, attention will be directed toward the perfection of pumping equipment.

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The OIL and GAS JOURNAL

TULSA, OKLA.

TO PLAN DEVELOPMENT IN STATE OF MONOGAS

NEW YORK, Mar. 11.—Creole Petroleum Corp., subsidiary of Standard Oil Co. of New Jersey, and Venezuelan Refining Co., subsidiary of Atlantic Refining Co., have contracted for the development of oil properties in the state of Monogas, eastern Venezuela, owned by Venezuelan Petroleum Co., according to H. R. Kunhardt, Jr., chairman of the board of Venezuelan Petroleum. It is anticipated that a well will be started during the present year.

F. J. WOLFE DIRECTOR OF ANGLO-AMERICAN CO.

(Continued from Page 137)

sales manager for eastern Canada, becomes director in charge of marketing; and Leo C. McCloskey, formerly assistant general manager of refineries, will, with C. R. Ewing, already a director, represent the refining interests on the board. Both new directors joined the Imperial staff in early youth in minor positions.

PRODUCTION DIVISION, PACIFIC COAST AREA

The Pacific Coast district of the A. P.I. production division will hold its annual meeting and dinner at 6 p. m. on the evening of Friday, March 20, at the Engineers Club, Los Angeles. The meeting will be presided over by District Chairman A. H. Bell, and the program will include election of officers and presentation of three papers.

A. F. Wilson, of the Standard Oil Co., will present a paper on "Recent Developments in Oil Well Foundations and Drilling Machinery," extremely interesting due to the many recent developments in derrick and machinery design caused by the deep drilling and heavy pressures encountered at Kettleman Hills and other fields.

R. A. March of the Shell Oil Co. will present a paper on "Design and Installation of Gas Traps and Vapor Systems," to be followed by a paper prepared by P. S. Magruder of the General Petroleum Corp., "Theoretical Consideration Involved in Multiple Traps and Vapor Recovery Installation." The subject covered by these two papers is more or less interlocking and the discussion will be held jointly and should bring forth a lively discussion from the proponents of the two types of gas saving installation.

MID-CONTINENT CRUDE RUNS AT NEW LOW

(Continued from Page 30)

REFINERY OPERATIONS IN WEST TEXAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs Mar. 1	Runs Feb. 1
Amarillo Producers & Refiners Corp., Pyote	3,000	(*)	(*)
Big Spring Refining Co., Big Spring	2,500	1,533	1,400
Big Lake Refining Co., Big Lake	2,000	(*)	(*)
Bluebonnett Oil Refining Co., Wickett	5,000	(*)	(*)
Burford Oil Co., Pecos City	6,000	4,500	4,300
Coltex Refining Co., Colorado	10,000	6,000	6,100
Cosden Oil Co., Big Spring	15,000	5,000	6,500
Deer Oil Corp., Luling	2,500	(*)	(*)
Grayburg Oil Co., San Antonio	6,000	(*)	(*)
Great West Refining Co., Big Spring	5,500	2,100	3,000
Gulf Oil & Refining Co., Sweetwater	5,000	5,000	5,000
Humble Oil & Refining Co., San Antonio	5,000	1,000	2,000
Humble Oil & Refining Co., McCamey	15,000	2,600	3,500
Magnolia Petroleum Co., Luling	5,000	4,200	3,000
Marathon Oil Co., Del Rio	5,000	2,500	2,000
Misko Refineries, Inc., Laredo	1,500	500	500
Mid-Tex Refining Co., Midland	3,500	(*)	(*)
Motor Fuel Products Co., Laredo	2,000	500	(*)
Pasotex Petroleum Co., El Paso	14,000	9,500	10,000
Pioneer Oil & Refining Co., Somerset	1,500	350	700
Richardson Refining Co., Big Spring	6,000	(*)	(*)
Rio Grande Oil Co., El Paso	6,000	(*)	1,100
San Angelo Refining Co., San Angelo	2,000	300	300
Sweetwater Oil & Refining Co., Sweetwater	2,000	(*)	(*)
The Texas Company, San Antonio	3,000	2,500	2,500
The Texas Company, El Paso	2,000	(*)	1,500
Tonkawa Petroleum Co., Pyote	5,000	(*)	800
Texas Mexican Oil & Refining Co., Laredo	600	500	500
Texas Petroleum Products Co., Somerset	1,500	600	700
Wickett Refining Co., Wickett	2,500	282	200
Total	147,600	49,370	55,500

*Shut down.

REFINERY OPERATIONS IN NORTH CENTRAL TEXAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs Mar. 1	Runs Feb. 1
Allstate Refining Co., Thrall	3,000	3,200	3,200
American Refining Properties, Wichita Falls	6,000	3,000	3,000
Archer Refining Co., Megargel	1,500	600	650
Central Texas Refining Co., Angus	4,000	(*)	(*)
Continental Oil Co., Wichita Falls	6,000	3,000	2,000
Dale Oil & Refining Co., Electra	4,000	2,124	3,200
Deer Oil Corp., Brownwood	2,000	(*)	(*)
Dixon Creek Oil & Refining Co., Kings Mill	3,500	3,200	3,200
Empire Oil & Refining Co., Gainesville	5,000	3,600	3,600
Falls Refining Co., Wichita Falls	2,000	800	1,000
Gulf Refining Co., Fort Worth	10,000	6,000	6,000
Humble Oil & Refining Co., Breckenridge	2,000	350	800
Humble Oil & Refining Co., Chilton	4,000	300	500
Humble Oil & Refining Co., Neches	5,000	1,000	(*)
Iowa Park Producing & Refining Co., Iowa Park	2,500	1,500	2,000
Kent Refining Co., Minerva	2,000	600	600
LaSalle Petroleum Co., Burkburnett (Noble)	3,500	(*)	(*)
Macmillan Petroleum Co., Isom	8,000	6,000	6,000
Magnolia Petroleum Co., Fort Worth	12,000	4,800	4,500
Magnolia Petroleum Co. (White Eagle plant), Fort Worth	6,000	3,000	3,500
Magnolia Petroleum Co., Corsicana	5,000	4,500	4,200
Marathon Oil Co., Fort Worth	5,000	3,500	3,400
Muenster Refining Co., Muenster	200	25	25
Olney Oil & Refining Co., Olney	2,500	2,000	2,500
Oriental Oil Co., Dallas	5,000	500	500
Orient Petroleum Co., Wichita Falls	3,000	(*)	(*)
Panhandle Refining Co., Wichita Falls	5,000	3,400	3,500
Petroleum Refractionating Co., Pampa	5,000	5,250	5,250
Phillips Petroleum Co., Isom	15,000	7,300	10,800
Primrose Refining Co., Wichita Falls	2,500	2,000	2,000
Simms Oil Co., West Dallas	4,500	4,000	2,000
Southland Refining Co., Olney	1,000	200	200
Star Refining & Producing Co., Fort Worth	1,500	500	500
Superior Refining Co., Tiffin	2,000	200	200
Tarrant Petroleum Co., Grand Prairie	2,500	(*)	(*)
Taylor Refining Co., Taylor	6,000	3,500	3,500
Taxman Refining Co., Wichita Falls	2,500	1,500	2,500
The Texas Company, Dallas	16,000	15,000	15,000
The Texas Company, Amarillo	4,000	3,000	3,000
Tidal Western Refining Co., Burkburnett	3,000	1,500	1,500
Texas Pacific Coal & Oil Co., Fort Worth	3,000	2,000	2,000
Texas Pacific Coal & Oil Co., Caddo	1,000	500	800
Waggoner Refining Co., Electra	3,400	1,500	(*)
Wilcox Oil & Gas Co. (Pampa Refining Co.), Pampa	4,000	2,700	2,500
Total	194,950	101,049	103,725

*Shut down.

OIL MAN'S CALENDAR

MARCH

11-13—Detroit, Mich., Michigan Oil Men's Association, Statler Hotel.

12—New York, Oil Trades Association of New York, Downtown Athletic Club.

16-17—Pittsburgh, Pa., Committee D-2, American Society for Testing Materials.

16-22—Los Angeles, Calif., second annual Exposition, Oil Equipment and Engineering Exposition.

17-18—Columbus, Ohio, convention, Ohio Oil and Gas Men's Association, Deshler Wallick Hotel.

19-20-21 — San Antonio, Tex., American Association of Petroleum Geologists, Gunter Hotel.

20—Los Angeles, Calif., Spring Meeting, A.P.I. Division of Production, Pacific Coast District.

23-24—Chicago, Ill., Independent Oil Men of America.

30-3—Indianapolis, Ind., eighty-first meeting, American Chemical Society.

APRIL

11-19—Detroit, Mich., convention, Aeronautical Chamber of Commerce.

13-18—Philadelphia, Pa., eighth annual convention and exposition, American Oil Burner Association, Ben Franklin Hotel.

15-16—St. Louis, Mo., first mid-year meeting, A.P.I. Division of Refining, Statler Hotel.

23-24—Cleveland, Ohio, semiannual meeting, National Petroleum Association, Hotel Cleveland.

27-28—Dallas, Tex., A.P.I. Central Group on Automotive Transportation, Adolphus Hotel.

MAY

4-9 — Charlotte, N. C., Good Roads Convention.

11-14—Memphis, Tenn., Natural Gas Department, A.G.A.

19-21 — Tulsa, Okla., Natural Gasoline Association of America, Mayo Hotel.

27-29—New York, National Foreign Trade Council.

JUNE

3-4—A.P.I. Division of Production, Baker Hotel, Dallas, Tex.

10-12—Swampscott, Mass., American Institute of Chemical Engineers.

15-18—Madison, Wis., fourth annual Oil and Gas Power Meeting, American Society of Mechanical Engineers.

REFINERY MARKET HAD DISCOUNTED REDUCTION

(Continued from Page 28)

which some marketers took as an indication that prices may be expected to be stabilized soon, and within a range of 3½ to 4 cents. The balance of the list of gasoline acted in sympathy with the lower motor grade prices and sold in normal volumes.

Natural Gasoline

Prices at their present low level are expected to continue for a week or two according to the expression of manufacturers at the close of the week. The AA grade was being freely offered at 3 cents and there was little buying.

A small quantity of this grade was shipped one-eighth cent below this quotation, but it is believed an increase in demands as a result of what appears to be approaching stabilization of the refinery market will maintain the present level of prices.

Kerosene and Distillates

No material change was seen in the kerosene quotation of the larger companies but the smaller refiners dropped their quotation to new lows in many cases. Kerosene, offered out of North Texas, Arkansas and North Louisiana at prices which net the Oklahoma refiner less than 3 cents, is being felt throughout the normal Oklahoma marketing territory. Some of this material is said to be high in sulphur content and is untreated but the low prices quoted are having a damaging effect none the less.

Gas Oil and Fuel Oil

Gas oil prices have been reduced to such a low figure the demand seems to have been stimulated as a result. Buyers still insist on low cold test oils, however. Some have based their offers to purchase by stating a "per barrel" price, taking advantage of a fractional gain by so doing. Seventy cents per barrel and 75 cents are being offered in an effort to beat down the prices quoted by refiners which are fractionally higher. The general fuel market has been maintained very well during the past week in face of the lower crude prices.

Lubricants and Wax

The 200 viscosity 3 colored oil was quoted over a wide range of prices extending from 8½ to 10¼ cents and bright stocks were freely offered at last week's price level, but there was no reduction in the general level of the lubricating oil market. The wax price also remained unchanged, but additional pressure is being brought against the market as a result of slightly lower quotations being posted in the Pennsylvania and Atlantic coast refineries.

LESS PROPANE IN FUEL INDICATED BY STUDY

(Continued from Page 138)

average the inlet temperature more nearly approximates the predicted temperature.

A table of observed and predicted vapor lock temperatures is shown on Table No. 1, and a graphical representation of the same on Figure No. 1.

Unfortunately these tests were made in the fall of the year when atmospheric temperatures were considerably lower than those experienced during the summer months. Therefore, it was necessary to use higher vapor pressure fuels to induce lock at these lower temperatures than are commercially marketed. As the formula for predicted vapor locking temperatures holds reasonably true at these high vapor pressures, there is every reason to believe the observed and predicted temperatures will hold true for the lower vapor pressures. The alignment between the observed and predicted temperatures may be somewhat closer for the lower vapor pressures than the higher vapor pressures, although tests have not been made to prove this point.

By substituting assumed values of the Reid vapor pressures in the above formula for predicting the vapor locking temperatures, a duplex scale (Figure No. 2) was drawn. If the Reid vapor pressure of a gasoline is determined, the vapor locking temperature can be found by the use of this scale.

The highest observed vapor locking temperatures in our tests was 48° F. above that of the atmosphere. For an assumed maximum summer temperature of 105° F. the Reid vapor pressure could not be over 5.7 pounds per square inch to prevent vapor locking in this car while running at 40 mile per hour. The average observed vapor locking temperature was 33° F. above that of the atmosphere and would require 7.3 pounds per square inch Reid vapor pressure to prevent vapor lock at a summer temperature of 105° F. and while running at 40 miles per hour. To insure freedom from vapor lock while running at summer temperatures in more than the average number of cars, a Reid vapor pressure not higher than 6.5 pounds per square inch must be marketed by the refiner.

More extensive use of efficient stabilizing equipment will, therefore, be necessary to all oil companies so that they can lower the vapor pressure of the gasoline as well as remove excessive amounts of propane. Furthermore, the later models of some of the car manufacturers indicate that the automotive engineer is striving to lower fuel system temperatures and in this way prevent vapor lock.

TABLE 1

Car	Atmospheric temperature	Fuel temperature at time of lock, Vacuum tank observed	Fuel temperature at time of lock, Vacuum tank outlet predicted	Reid vapor pressure at 100° F., Main tank	Reid vapor pressure at 100° F., Vacuum tank outlet
1	72°	116	111	12.0	11.5
	72°	116	122	10.0	9.4
	68°	124	121	9.9	9.6
2	70°	105	108	14.3	12.1
	70°	116	113	....	11.0
3	79°	127	129	10.8	8.5
	50°	87	92	17.3	15.7
	50°	93	91		15.9
	50°	92	90		16.1

Car	Atmospheric temperature	Sediment bowl outlet observed	Sediment bowl outlet predicted	Reid vapor pressure at 100° F., Main tank	Reid vapor pressure at 100° F., Vacuum tank outlet
4	72°	90	86	17.2	
	74°	99	94	15.2	

Car	Atmospheric temperature	Pump inlet observed	Pump outlet observed	Reid vapor pressure at 100° F., Predicted	Reid vapor pressure at 100° F., Main tank
5	71°	88	96	96	14.4
	71°	91	100	95	14.8
6	75°	95	106	105	12.6
	75°	86	94	95	14.9
	75°	90	98	102	13.2
	62°	76	80	70	22.5
7	49°	77	86	72	21.6
	49°	78	85	72	21.6
	52°	88	100	96	14.6
	52°	102	...	104	12.7
	51°	80	90	84	17.8
	51°	87	105	89	16.3
8	60°	90	...	81	18.8
	60°	84	88	75	20.5
	61°	85	95	75	20.7
	61°	90	96	83	17.9
9	58°	86	103	83	18.0
	67°	92	102	83	17.9
	59°	95	110	95	14.9

GASOLINE WAR CAUSES CUT IN CRUDE MARKET

(Continued from Page 29)

residual fuel oil resulting from refinery operations on this basis has been practically dumped on the market, as a number of sales have been made for fuel oil at 8 and 10 cents per barrel. The situation has been further complicated during the past several months by the appearance of co-operative refining and marketing contracts whereby the producer of crude oil is paid on the basis of the net realization from refined oils. Some of these contracts while theoretically and economically sound in principle are particularly vicious and the producer is not protected with a minimum price and has no assurance of what he will ultimately receive for crude oil delivered under such contracts. It is quite evident on the basis of gasoline selling for 12½ cents that his return will be exceptionally small, particularly in view of the fact that gasoline manufactured in conformity with these contracts is selling somewhat below this figure.

When the present gasoline price war started late in February, it was confined principally to southern California, but substantial reductions have already been made at other points up along the Pacific Coast in Washington and Oregon. Conditions in and around Tacoma have been especially unsettled for some time, due to the importation of gasoline refined from crude oil originating outside of California. In the San Francisco Bay region the Standard Oil Co. has reduced its wholesale price to 13 cents per gallon and placed its resellers on a 2-cent differential. Independent refiners immediately dropped their retail prices to 13 cents per gallon, tax paid, thus maintaining their quotations 2 cents below major gasoline prices. When posting the new crude oil price schedule the Union Oil Co. issued a statement to the effect that "the posted schedules of prices for crude oil in the fields of this State have been for some time out of line with the values of the crude and of the products obtainable therefrom. The result has been that the marketing companies have not been willing to increase their contractual commitments and crude oil is being actually sold in the fields at prices below the posted schedules. This company has therefore determined that effective March 10 it will place into effect a reduced schedule of prices which it will pay for crude oil purchased by it in the different fields."

A. T. Jergins, president of the Independent Petroleum Association of California, issued a statement subsequent to the price reductions, reading as follows: "This drastic cut brings the price of crude oil far below actual production cost, absolutely wiping out the profits of independent producers, and if maintained for even a short period of time will place them in a grave financial situation. The present low prices of gasoline brought about by the present gasoline war likewise place independent refiners in a similar situation. Many of these refiners today are facing financial ruination. Independent producers are not responsible for the present gasoline war which could easily have been averted. Neither the present price of gasoline nor the drastic cut in the price of crude oil are the result of economic conditions and therefore are unwarranted and uneconomic."

JANUARY DAILY OUTPUT IS 80,000 GALLONS LESS

(Continued from Page 138)

creased 1,200,000 gallons, the advances were small at the various fields.

Stocks of natural gasoline held by plant operators on January 31, amounted to 25,470,000 gallons, an increase during the month of nearly 1,200,000 gallons.

(Thousands of gallons)

	Natural gasoline: Production Jan., 1931	Production Dec., 1930	Production Jan., 1930	Stocks end of month Jan., 1931	Stocks end of month Dec., 1930	Blended motor fuel Jan., 1931: Natural gasoline used	Naphtha or other oils used	Stocks end of month
Appalachian	8,900	8,300	10,900	4,197	2,965	70	84	220
Ill., Ky., etc.	1,100	1,100	1,400	827	242	....	....	....
Oklahoma	43,100	41,400	50,000	9,401	8,485	101	115	125
Oklahoma City	3,500	3,600	1,800	2,121	1,077	....	....	....
Osage County	7,400	6,200	6,200	1,650	1,715	....	....	....
Seminole, etc.	16,300	16,100	23,600	2,485	2,323	12	11	40
Rest of State	15,900	15,500	18,400	3,145	3,370	89	104	85
Kansas	2,700	2,700	2,600	1,052	947	7	1	4
Texas	40,800	42,900	37,200	6,357	8,008	149	237	111
Panhandle	19,700	22,000	19,000	2,346	3,501	47	61	31
North Texas	3,900	3,800	3,400	943	933	7	6	24
West Central	11,900	12,100	11,500	2,444	2,630	90	166	52
Rest of State	5,300	5,000	3,300	624	944	5	4	4
Louisiana	4,800	4,700	7,700	1,113	739	8	5	7
Arkansas	2,600	2,600	2,400	206	347	203	181	18
Rocky Mountain	5,700	6,000	3,200	608	776	....	....	....
California	64,200	66,600	69,800	2,209	1,807	....	....	....
Huntington Beach	2,000	2,300	3,500	....	....	....	....	....
Kettleman Hills	16,300	15,400	8,500	....	....	....	....	....
Long Beach	13,700	14,200	14,800	....	....	....	....	....
Santa Fe Springs	12,100	14,400	21,300	....	....	....	....	....
Seal Beach	1,500	1,600	3,200	....	....	....	....	....
Ventura Avenue	4,800	5,200	5,500	....	....	....	....	....
Rest of State	13,800	13,500	12,700	....	....	....	....	....
Total	173,900	176,300	185,200	25,470	24,316	538	623	485
Daily average	5,610	5,690	5,970	....	....	17	20	....
Total (thousands of bbls.)	4,140	4,198	4,410	606	579	13	15	12
Daily average	134	135	142	....	....	....	....	....

FURTHER RELIEF FOR KANSAS "STRIPPERS"

TOPEKA, Kans., Mar. 7.—Five oil companies have agreed to buy 4,300 bbls. a day of the southeastern Kansas "distress" oil, left without a permanent market January 1 with the withdrawal of the Prairie Oil & Gas Co. as a purchaser of crude oil.

The companies, Governor Woodring announced, would begin taking the oil April 15, at the expiration of a 60-day agreement between the Standard Oil Co. of Indiana and the Prairie, by which the Standard arranged to take 6,000 bbls. a day after February 15.

While approximately 2,300 bbls. of the output of the 12,000 small wells involved remained to be cared for, Governor Woodring expressed confidence that several of the companies not entering the agreement would assist in furthering a permanent solution to the problem when they found themselves capable of disposing of their purchases.

The Standard of Indiana agreed to take 2,000 bbls. a day on a permanent basis after April 15. The Standard of Kansas agreed to take 300 bbls. additional a day. The Sinclair Refining Co. was listed for 1,000 bbls., the Skelly Oil Co. for 250 bbls., and the Cities Service Co. for 750 bbls.

"I am very much gratified," the governor said, "at the splendid co-operation which has been shown in the settlement in part of this problem."

CARL W. WANGERIEN DIES

OKMULGEE, Okla., Mar. 9.—Carl W. Wangerien of Okmulgee died in San Antonio March 7 after a short illness. He was a prominent civic worker and an independent oil operator, a native of Ohio, coming to Okmulgee more than 12 years ago and since has been identified with the oil industry. He was born January 8, 1886. Mr. Wangerien was taken to the hospital at San Antonio February 13. The funeral services were held in the Episcopal Church in Okmulgee and the body taken to Cleveland, Ohio. Surviving Mr. Wangerien are the widow, a sister, Alam Wangerien, and his mother, Mrs. Augusta Wangerien, of Cleveland, and a brother, Harry Wangerien, of Santa Fe, New Mexico.

KEEP LID ON IN EAST

OLEAN, N. Y., Mar. 7.—Continued curtailment of crude oil production in the Bradford and Allegany oil fields has been announced by Stephen C. Pohe, president of the Penn Petroleum Co. and chairman of the conservation committee of the New York State Oil Producers Association. The program as agreed upon provides for a 50 per cent decrease in output in the Bradford-Allegany Field, where pressure methods are used exclusively to enhance production, and a decrease of 30 per cent in the remainder of the territory, which includes western Pennsylvania, New York, West Virginia and eastern Ohio.

IDENTITY OF SAND IN RUSK AND GREGG OF MATERIAL IMPORTANCE

By L. E. Bredberg

DALLAS, Tex., Mar. 7.—The Dallas Geological Society was pleasantly surprised tonight, but taken absolutely by surprise when approximately 200 geologists from Oklahoma, Texas, Arkansas and Louisiana tried to crowd their way into the Danish Room of the Adolphus Hotel to hear several short papers read, and several theories advanced as to just which formation, Woodbine or Tokio sand, is responsible for the production in the newly discovered fields in Gregg and Rusk Counties in East Texas. The number of attending geologists who drove many miles to the meeting, fully acclaimed the interest shown in the new fields, and the interest displayed in the geology of the areas. The question of the producing formation is a weighty one, and only by ballot was the Woodbine chosen as the most popular of the two sands; ballot displacing theory and science in forming the conclusions of the many men.

R. B. Whitehead, president of the society, said that the question of naming the correct producing formation was a problem, and any conclusions drawn are subject to change without further notice. This humorous allusion to such an enigmatical subject drew a hearty laugh from the crowd, but before all sides of the question were presented by the various geologists and paleontologists who have been studying the East Texas Basin and its formations, likewise the Arkansas and Louisiana formations, it was found that many different views on the stratigraphy of the eastern rim of the basin had been evolved.

There were 132 votes cast on the producing formation, the Woodbine sand winning with a total of 63, the Tokio sand receiving 20 votes, the Eagleford shale 27, Eagleford-Woodbine 9, Tokio-Woodbine 10, top of basal Cretaceous 3. Votes on the other formations in the area showed that the Woodbine formation was not absolutely and satisfactorily shown and proven to their satisfaction as being the producing formation in Gregg and Rusk Counties.

Dr. Gayle Scott, head of the department of geology at Texas Christian University, was the first to give a short paper and talk on the "Origin of Woodbine Sands." Mr. Scott related the position of this sand, where its outcroppings might be observed, and how it could be recognized. He stated that most of his work had been confined to the stratigraphy of the formation, but that he had come to the conclusion that the sands were the result of a large delta deposit, and gave reasons bearing out his conclusions.

New Method of Research

Dr. F. B. Plummer, of the Bureau of Economic Geology for the State of Texas, and a student of the sands and waters of the East Texas Basin, said that he was most pleased with the unique meeting held with geologists from other states, in which they could co-operate in drawing definite conclusions as to the Woodbine formations and the formations responsible for the production in the new areas in Gregg and Rusk Counties. He called the meeting unique in that it was the first time that a group of geologists had met to take a vote on such a subject, and that the meeting introduced a new method of geological research.

Dr. E. C. Sargent who worked with Doctor Plummer in studying the sands and temperature of waters in the East Texas Basin showed lantern slides of cross sections and charts to illustrate Doctor Plummer's remarks and theory as to the Woodbine sands reaching up over the Sabine uplift on the east, and how it possibly merged with the Tokio and Blossom sands which are the producing formations in Louisiana, and which are later sands than the Woodbine. An ascending sea at the top, and a receding sea (Comanchean age) at the base was probably responsible for the upper and lower Woodbine sands, Doctor Plummer theorized.

Merle Israelsky of the United Gas Service Co., Houston, who has studied the paleontology of the Tokio sand showed several charts on the formations in western Louisiana and Arkansas and East Texas, and held to the opinion that the production in Gregg and Rusk Counties was not coming from the Tokio sand.

P. W. McFarland advanced that the Woodbine extended towards the west, thickening as it progressed in that direction, and J. B. Sasse, of the Shell Petroleum Corp., Dallas, upheld this theory in his paper on the stratigraphy and paleontology of the East Texas Basin, showing how at least 700 feet of this deposit had been proven existing in Rains and Van Zandt Counties, wells in the Van Pool in the latter county bearing out his statement.

Mr. Sasse stated that micro-faunal indications of Tokio sand have been found in the Joiner Pool, southern Rusk County, but that the Farrell-Lathrop and Bateman wells in northern Rusk and Gregg Counties had yielded no such fossils in the oil sand. However, he said, the producing sands in the Lathrop wells were found to be similar to the volcanic sands found in Arkansas, which sands denote the Tokio. He also stated that fossils found in wells farther to the west of the basin denoted the Austin age, and concluded that possibly this condition represented both Woodbine and Tokio formations.

E. M. Rice, geologist for the Pure Oil Co., Fort Worth, gave a short paper on the "Age of the Fossils of the Brownstown Marl."

Louisiana's Opinion

Dr. W. C. Spooner of Shreveport was the main representative of the Arkansas and Louisiana group of geologists, discussing at length the formations in those states, especially the Blossom and Tokio formations. Doctor Spooner stated that the Blossom sand was found in thin but recognizable streaks as far west as the Amerada Petroleum Corp.'s No. 1 Christian near the town of Big Sandy in Smith County, and the Farrell-Lathrop discovery, 6 miles northwest of Longview in Gregg County. "With the Blossom absent," he stated, "it is difficult to differentiate between the Brownstown and Tokio." He also remarked upon the argument as to whether it was Woodbine or Tokio that extended to the Gregg-Harrison County line, that he called this sand Woodbine.

An Old-Timer's View

Dr. R. G. Hill, former chief geologist of the United States Geological Survey, and former instructor in the department of geology of the University of Texas, and a student of geology since 1882, addressed the meeting briefly stating that he thought the producing formation in the new areas was neither Woodbine or Tokio but Blossom sand. Doctor Hill defined the Woodbine sand as "lying between the top of the Comanchean and the base of the Eagleford, and that is pretty hard to locate," he added.

A round-table discussion was held after the papers were read, and many questions were asked in regard to the East Texas Basin and formations lying therein, being confined principally to the Woodbine or Tokio sands.

An Important Matter

It was also brought out in the meeting that Woodbine sand fields along the East Texas fault zone had produced 30,000 bbls. of oil per acre, with the Van Field rated as good for at least 60,000 bbls. per acre, while Tokio sands only produced around 7,500 bbls. per acre in Arkansas and Louisiana. For this reason the question as to whether the producing formation in Rusk and Gregg Counties is Woodbine or Tokio is a material one, and the companies and operators producing or operating or intending to operate in these areas are especially anxious to know which of the two is the correct formation found in the wells in the Farrell-Lathrop, Kilgore and Joiner Fields.

Practically all of the major producing companies have obtained protection leases in the two counties, and acreage in nearby counties, but if the sand is proven to be the Woodbine these same companies would no doubt spend more money in the areas purchasing more leases and royalties, and would expect greater returns on their investments, whereas on the other hand, if the sand is the Tokio formation investments will have a tendency to be held up, and major pipe line companies will enter or stay out of the area accordingly, regardless of their sister companies holding leases in or near the fields.

If the producing formation is Tokio the fields, it is believed, will be of shorter life, yielding but an approximate one-fourth in oil of what the Woodbine sand would yield, and already many are conjecturing that the yield per acre will be small, theorizing that the lack of gas pressure in the wells, and relatively thin sand section would prove this the case.

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PRESIDENT CRAWFORD WARNS THE REFINERS

(Continued from Page 31)

fining industry was that of the bucket-shop to the stock exchanges; whereas, we have actual material to move they were able to buy or sell short as they pleased and were able to make as much or more profit out of a declining market as they were from a strong market which was profitable to the actual refiner. Few brokerage houses could exist on a level stable market such as is desirable for a sound refining industry. In the few periods of stability which we have had the last few years, brokerage houses have diminished in number. In periods unprofitable for the refiner they have increased. Much less of our product is now handled through brokers than formerly. However, in every period of advancing prices we find in the hands of brokers enough material, purchased at a flat price for delivery over a period, to check the advance towards the realization of our cost of manufacture. It is my personal belief that sales at a flat price for delivery over a period will always react to the detriment of the seller. We are all familiar with the methods by which 10 cars of distressed gasoline may be made to look like a thousand, and with the other methods which have crept into the brokerage game."

Late Fields

(Continued from Page 40)

bbls. of oil a day from sand at 3,042-44 feet.

Youker and others' No. 1 Sellers, SE cor. SW SW, Section 19-19-1w, in the Ritz-Canton Pool, in McPherson County, was slopping over with oil from the Viola at 3,412-25 feet. Tanks were being erected and the well was expected to be completed in a few days. It is the seventh deep producer in the Ritz-Canton area.

Rush Drilling Co.'s No. 1 Johnson, C SE NW, Section 10-19-2w, in the Decker gas field, was showing 1,000,000 feet of gas after drilling out the cement plugs in the top of the chat at 2,920 feet. It will be drilled deeper into the chat formation.

RANDOLPH TESTS ABANDONED

BRADFORD, Pa., Mar. 7.—An attempt to find oil and gas in the upper end of Hotchkiss Hollow near Randolph, in western Cattaraugus County, New York, has been abandoned by Elko Oil & Gas Corp. and the Arkansas company. The effort had been carried on for several years.

W. B. Frost, contractor, has removed drilling apparatus from the Hotchkiss farm to territory near Silver Creek, Chautauqua County, New York. The Elko company sank two wells, each to a depth of nearly 5,000 feet. The Arkansas company drilled a shallow well.

What happens when the dirt is pushed back?

"Soil tested" S-W LYNE-KOTE *protects your pipe lines from "hot spots"*

Do you have any doubts as to how long your pipe lines will stay in service—or do you *know* that they are protected from corrosion "hot spots" by a long-lived pipe line coating?

Lyne-Kote, economical and genuinely anti-corrosive, is a product of Sherwin-Williams, world's largest manufacturers of protective coatings. The following excerpt from the report of a test on Lyne-Kote gives an accurate picture of the average comparison:

"Samples were then put back for further exposure and other chemicals were added to the soil, including Oakite. A few days ago these samples were taken out for examination. All the cold coating had been eaten off—another coating had been badly pitted, almost to the bare pipe in one place—another showed slight pitting. *Lyne-Kote was in perfect condition, showing no signs of pitting or deterioration in any form.*"

Lyne-Kote Enamel applied hot over Lyne-Kote primer is recommended for severe conditions such as rivers, swamps, etc. Lyne-Kote cold application made in liquid consistency, is suitable for application with brush just as it comes from the container. No heating is necessary.

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These LYNE-KOTE features mean better pipe line protection.

1. Impervious to air, moisture, acid, alkali and oil.
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5. Withstands shocks and abrasion.
6. Applied hot, hardens in a few minutes—cold, in 8 to 10 hours.
7. No bubbles or pin holes.

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Of Interest to Sales Departments

Expect Demand for Kerosene in China To Gain This Year

NEW YORK, Mar. 8.—Corrective measures suggested for the stabilization of the silver market are expected to be reflected by a pronounced recovery in demand for American petroleum products in China and other parts of the East. Petroleum interests here received with a great deal of interest the report of the Pittman committee, presented to the Senate foreign relations committee this week, suggesting that President Hoover seek to discuss with the British government for India suspension of the present policy of melting silver coin for sale of bullion.

According to American companies distributing kerosene in China, demand in that country suffered a substantial decline last year. Reports to the Department of Commerce indicate that the total business in kerosene in Tientsin last year was in the neighborhood of 80 per cent of the volume for 1929.

According to the Department of Commerce, the outlook for kerosene business in China this year is clouded only by the exchange situation, and with definite steps under way to correct this condition the stage would appear to be set for a real recovery in demand which should have a beneficial effect on the market position in this country.

A report to the Department of Commerce from Louis C. Venator, American trade commissioner at Tientsin, this week says: "Officials of leading oil companies operating in Tientsin estimate the total business in kerosene during 1930 to have been in the neighborhood of 80 per cent of that done in 1929. At present, prospects for 1931 appear promising as the various unfavorable factors affecting the 1930 trade, with the exception of the exchange problem, show some signs of mitigation. Completely favorable conditions, of course, depend on continued peace. However, transportation conditions under the present unified government already have shown some improvement and the Manchurian authorities in immediate control of this area appear to have a reasonable attitude toward taxes. Some difficulty still exists in regard to the now entirely disorganized troops remaining in sections of Honan and Shensi, but these, according to the program of the present government are to be dispersed or taken under control.

"At the end of the year, Shansi currency had only slightly recovered, but plans were under way to rehabilitate it. Shansi and Tientsin business communities, therefore, believe that recovery will be a question of a comparatively short time, depending, of course, upon the attitude of the new government formed in Shansi, as well as that of Nanking and Manchurian financial authorities, which appears favorable.

"Although the exchange situation still remains unfavorable, improved conditions—such as appear possible in case the present peace continues—should increase the amount of money available for necessities such as kerosene. In addition, the general market, including the price of native products, is slowly adjusting itself to increased prices for imported necessities of this description.

"The storage facilities of the leading companies, totaling about 350,000 bbls., however, were reported to be almost completely utilized, largely with kerosene. In addition, the tanks at Tangku, harbor of Tientsin, probably held between 300,000 and 350,000 bbls. additional."

DEEP WATER SHIPPING OF OILS BECOMING INCREASING FACTOR

NEW YORK, Mar. 7.—Leading world oil companies are taking advantage of present depression in the shipbuilding industry to thoroughly modernize their tanker fleets. The present building program of the oil industry, without parallel in the history of the oil business, has attracted considerable attention, particularly in view of the fact that the petroleum industry at present, with the largest aggregate tanker tonnage in its history, now has a considerable proportion of this tonnage tied up idle for lack of cargo.

As of January 1, this year, according to private compilation, there were a total of 1,437 tankers of 500 tons gross or over, aggregating 11,825,013 deadweight tons, afloat in all part of the world. This fleet has an approximate carrying capacity of 88,688,000 bbls. of clean oil, or 76,863,000 bbls. of dirty oil. More than 1,000,000 additional tons of tankers was under construction at the close of the year.

Early in January there were approximately 60 American tankers, aggregating 582,000 deadweight tons, laid up out of service, and reports from abroad indicate that approximately 100 foreign tankers were also temporarily inactive, reflecting depressed conditions in the world oil industry.

Oil companies operating tanker fleets generally figure the "life" of a tanker at 20 to 25 years, after which it must be classed as obsolete. Tankers used to carry clean oil exclusively have a correspondingly shorter life, it being estimated that excessive corrosion and "pitting" through the carrying of clean oil shortens the life of a tanker by about 10 years. Thus, a tanker may spend the first 10 or 15 years of its "life" carrying clean oil, and then becomes a dirty oil tanker, depreciation in the carrying of dirty oil being considerably smaller than in the case of clean oils.

A record of the world's tanker tonnage by ages (vessels 500 tons gross, or 800 tons deadweight and over) as of January 1, 1931, by ages, follows:

Age—	No.	D.W.T.
Up to 5 years	418	3,671,978
6-10 years	322	2,870,888
11-15 years	387	3,249,211
16-20 years	146	1,062,193
21-25 years	50	320,748
26-30 years	37	241,013
31-35 years	34	214,655
36-40 years	26	134,933
41-45 years	11	37,545
Over 45 years	6	21,849
Total	1,437	11,825,013

Oil Company Tankers

Leading oil companies in the past few years have drastically revised their marine operations. Most of the large companies, both in the United States and abroad, operate subsidiary companies to handle their deepwater floating equipment. Standard Oil Co. (New Jersey) went a step farther in this direction recently, through the organization of an operating company to handle the tanker fleets of all of its European subsidiaries.

Soviet authorities are also building a number of tankers to transport the steadily growing production of Russian crude and refined petroleum. With early start of construction of the Iraq pipe line looked for, it is believed that French petroleum interests will shortly start construction of a fleet of tankers to handle the movement of Iraq oil from Tripoli to French ports where refineries will be constructed.

Standard Oil Co. (New Jersey), through Standard Shipping Co., its marine subsidiary, has taken a leading part in construction of tankers for use of its American and European subsidiaries. Standard Shipping in 1929 placed contracts for 15 new tankers, with aggregate deadweight tonnage of 243,000 tons, and it is reported that further additions to the Standard fleet are now being contemplated. The New Jersey company operates the largest fleet of privately owned vessels now under the American flag.

Vacuum Oil Co., Cities Service, Standard Oil Co. of California and The Texas Company were also active in new tanker construction last year, while Sinclair Consolidated Oil Corp. also added considerably to its fleet in 1930. Standard Oil Co. of New York, Sun Oil Co. and Gulf Refining also added a number of large modern tankers to their fleets last year.

BRITISH IMPORTS OF OILS SHOW DECLINE

NEW YORK, Mar. 8.—Imports of crude petroleum and refined products into Great Britain during January of this year fell off from the January, 1930, total, although substantially over December imports. A total of 207,018,955 gallons of crude and products was imported into Great Britain last month, as compared with 171,553,690 gallons in the previous month and 211,470,783 gallons in January, 1930.

Imports into Great Britain last month, by products, with comparison for January, 1930, follow:

	—Imperial gallons—	
	Jan., 1931	Jan., 1930
Motor spirit	78,617,991	89,954,539
Illuminating oil	32,303,540	29,970,808
Lubricating oil	7,399,204	8,855,074
Gas oil	5,704,855	11,293,599
Fuel oil	48,002,195	40,383,333
Crude oil	32,112,797	30,719,872
Other oils	2,878,373	293,558

A sharp increase in imports of Persian crude into Great Britain last month developed, imports from this source increasing 5,465,246 gallons over those for January last year.

CONSPIRACY CHARGES FILED

Recovery of $20,000 alleged damages from Union Oil Co. is asked by R. W. McCoy, Los Angeles, Calif., filling station operator, who has filed charges of conspiracy to control price of gasoline in Los Angeles against seven major oil companies. The companies named in the suit are the Union company, Richfield Oil Co., Standard Oil Co. of California, General Petroleum Co., The Texas Company, Associated Oil Co. and Shell Oil Co.

NEARLY 36,000,000 CARS

Automobiles in America, Europe, Asia, Africa and Oceania, according to a compilation by Automotive Industries, number 35,810,768, representing an increase over last year of 2.1 per cent. The United States has approximately 26,000,000 of this number.

PURE PENN GRADE FOR VEEDOL

Tide Water Oil Corp. has announced that its lubricant, Veedol, is to be marketed as a pure Pennsylvania product. This lubricating oil has in the past been made from a mixture of western and Pennsylvania crude oils.

December Shows Gain Over 1929 Gallonage, Tax Report Reveals

An increase of 52,619,000 gallons in consumption of gasoline in the United States during December, 1930, over that of the same month in 1929, is shown in the American Petroleum Institute's compilation of reports made by dealers in the various states under provisions of the gasoline tax laws. Compared with the figures for November, 1930, however, the December, 1930, daily average declined 11.9 per cent.

Gasoline consumption in all the states and the District of Columbia, excepting Illinois, New York, California and Pennsylvania, where comparative figures were not available, was 11,022,179,000 gallons for the 12 months ending December, 1930. This is a gain of 626,448,000 gallons over the preceding year.

GASOLINE CONSUMPTION BY STATES
DECEMBER, 1930

	Dec., 1930 gallons	Dec., 1929 gallons
Alabama	13,390,000	13,561,000
Arizona	6,497,000	7,012,000
Arkansas	10,686,000	9,467,000
Colorado	10,488,000	10,390,000
Connecticut	17,961,000	15,016,000
Delaware	2,816,000	3,211,000
District of Columbia	6,443,000	5,785,000
Florida	21,213,000	20,530,000
Georgia	18,191,000	18,433,000
Idaho	3,578,000	3,976,000
Illinois	71,238,000	63,763,000
Indiana	35,544,000	29,603,000
Iowa	26,670,000	24,381,000
Kansas	26,153,000	26,265,000
Kentucky	12,893,000	11,302,000
Louisiana	14,527,000	14,705,000
Maine	6,985,000	5,137,000
Maryland	13,837,000	12,493,000
Massachusetts	41,998,000	35,196,000
Michigan	57,316,000	53,424,000
Minnesota	25,592,000	21,718,000
Mississippi	*10,712,000	10,767,000
Missouri	35,581,000	29,494,000
Montana	4,707,000	4,667,000
Nebraska	16,370,000	14,935,000
Nevada	1,335,000	1,404,000
New Hampshire	4,010,000	3,344,000
New Jersey	40,942,000	37,643,000
New Mexico	4,414,000	4,037,000
North Carolina	22,053,000	27,522,000
North Dakota	4,096,000	3,762,000
Ohio	70,193,000	67,196,000
Oklahoma	23,050,000	26,367,000
Oregon	11,593,000	13,170,000
Rhode Island	6,885,000	5,781,000
South Carolina	9,785,000	10,112,000
South Dakota	7,980,000	7,485,000
Tennessee	16,936,000	16,219,000
Texas	66,331,000	65,438,000
Utah	3,792,000	4,032,000
Vermont	2,966,000	2,419,000
Virginia	18,056,000	16,548,000
Washington	19,963,000	18,722,000
West Virginia	9,953,000	8,980,000
Wisconsin	29,046,000	26,274,000
Wyoming	2,443,000	2,003,000
Total	886,308,000	833,689,000
Daily average	28,591,000	26,893,000
Increase over previous year:		
Amount of increase	52,619,000	
Percentage increase in daily average	6.3%	

	—Quarter ending— Dec. 31, 1930	Dec. 31, 1929
California	336,140,000	323,592,000
Pennsylvania	267,573,000	247,044,000

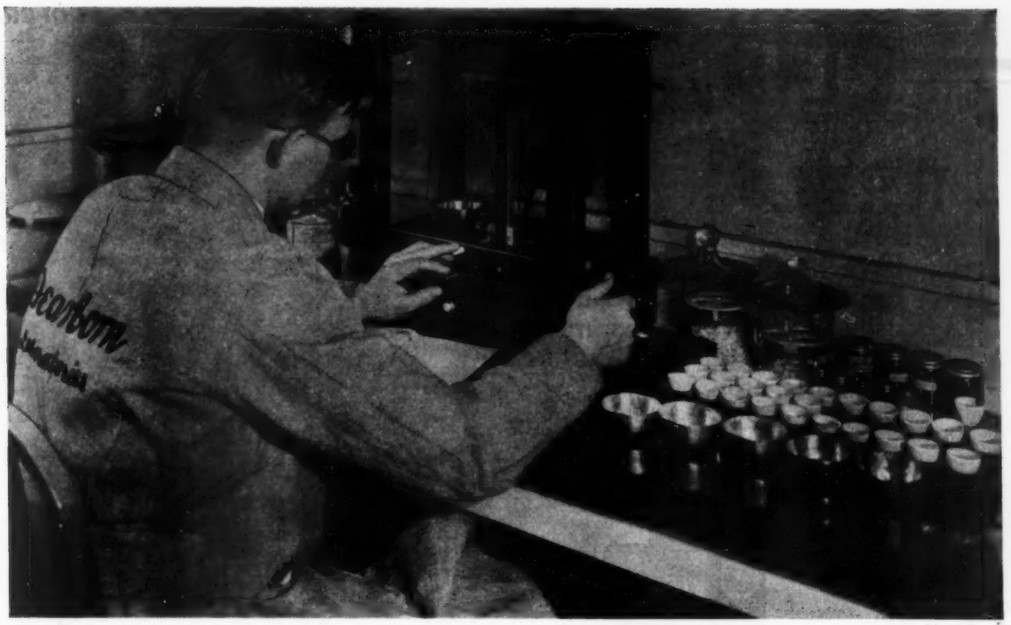
*Estimated.

REDUCE PRICE ON ALCOHOL

NEW YORK, Mar. 8.—Effective April 1, the German alcohol monopoly will reduce its price for alcohol for blending purposes from 80 to 70 marks per hectoliter.

As a result of this reduction, oil distributors will be required to take 3½ per cent, instead of 2½ per cent, of production, under the terms of the law compelling marketers to blend alcohol with gasoline.

It is expected that the petroleum industry in Germany will use 800,000 hectoliters of alcohol during the 12 months beginning April 1.

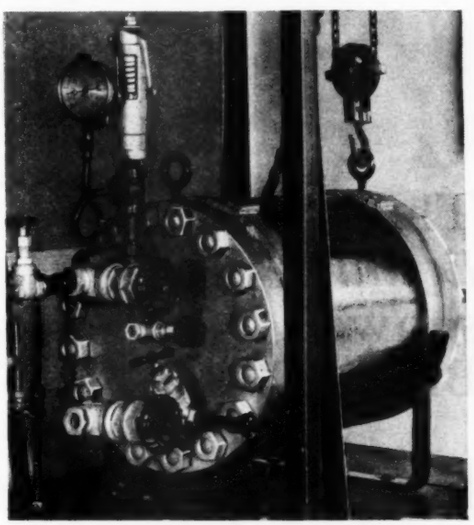


The Challenge of Increasing Pressures

Increasing steam pressures in the boilers in oil field service demand exact scientific accuracy in correction of harmful water tendencies. In the old low pressure boilers, water troubles were often either treated indifferently or ignored. Efficiency and safety were of no great concern. In these new boilers, both high efficiency and safety are dependent upon complete correction of the conditions that may cause scale formation, foaming, embrittlement, pitting and corrosion.

The challenge of modern pressures is not as simple in regard to correction of water troubles as might appear. New considerations arise. Some corrective agents which produced desirable results under low pressures decompose chemically at higher pressures and produce the causticity which makes embrittlement possible. Changes in boiler design, increased speed of circulation, reduction of relative volumes of water and increased evaporation per unit of heating surface have required that each feature be met with suitable types of treating materials.

The Dearborn Chemical Company is working actively and successfully with these problems today but the story of our accuracy and ability in water correction at modern pressures is the story of exacting research over nearly a half century.



An experimental high pressure boiler in the Dearborn Laboratories.

This company has always approached the problem of correction of water troubles through our laboratories. Here in the hands of graduate chemists each water sample to be treated is analyzed. The nature and quantity of the soluble impurities are determined. Operating conditions are considered and the treatment supplied is correct scientifically for use in overcoming the troublesome tendencies disclosed.

Dearborn Treatment is introduced into the boilers. This is not only the most effective in results but is by far the most economical method. Reactions are brought about inside the boilers at operating temperatures and pressures.

The cost of Dearborn Treatment is as uniformly low as is possible in the production and servicing of a 100% product.

Our organization covers the six continents, embracing among our customers every type of steam producing plant. To these customers our responsibility for results is constant and our service consistent with their requirements. It is obvious that for each of these thousands of plants, association with the Dearborn Chemical Company is productive of desirable results in correction of water troubles. It is obvious that painstaking scientific approach to each water problem is productive of a degree of results not obtainable otherwise.

This service, this responsibility for results and this high effectiveness are available to you in equal degree, regardless of operating pressures and location. Write us, describing your conditions. Send a gallon sample of your water supply to our laboratories at 1035 W. 35th Street, Chicago. Analysis and recommendation are made without cost.

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SOMERVILLE, MASS.

WILDCAT OPERATIONS IN OKLAHOMA

(Continued from Page 42)

Mummert Drlg. Co. et al's No. 1 Cormick, C NW SE Sec. 9-27-2 ..... Shut down 2,700 ft.
Blackwell Oil & Gas Co.'s No. 1 Harshman, Sec. 2-26-1w .. Rig on ground.
Boucher Oil Co.'s No. 1 Jefferson, NE SW Sec. 32-26-1w .. Drlg. 3,042 ft.

KIOWA COUNTY

Christian's No. 1 Jones, NE SE Sec. 8-7-18w ..... Rig.

LATIMER COUNTY

Choctaw Gas' No. 1 Weaver, C NE NW Sec. 4-6-18 ..... Spudding.
P. English's No. 1 Unknown, NW SE Sec. 16-6-19 ..... Shut down 300 ft.
LeFlore Oil Co.'s No. 1 McBee, NW cor. Sec. 3-7-21 ..... Shut down 3,601 ft.

LE FLORE COUNTY

D. S. Howard et al's No. 1 Holmes, SE SW NW Sec. 16-3-22 ..... Shut down 1,300 ft.

LINCOLN COUNTY

Mote-Wheeler's No. 1 Stafford, NW NE Sec. 32-17-4 ... Drlg. 3,224 ft.

LOGAN COUNTY

Eason Oil Co.'s No. 1 Young, C SW NE SW Sec. 34-17-4w .. Sand 4,919-42 ft.; made 870 bbls. 21 hrs. and 485 bbls. the second 24 hrs.

McINTOSH COUNTY

Patterson et al's No. 1 Smith, SW cor. NW SE Sec. 32-9-16 ..... Fishing 5,687 ft.

MUSKOGEE COUNTY

Rebold's No. 1 Miller, SE NE NE Sec. 32-13-19 ..... Rig.
Sioux Oil Co.'s No. 1 Unknown, NW SE Sec. 21-11-19 .... Shut down 1,011 ft.

OKFUSKEE COUNTY

Henry Oil Co.'s No. 1 Harjo, Sec. 36-12-9 ..... Shut down 4,127-57 ft.; water; plugged back to 3,161-85 ft.; showing 10 bbls.
E. L. Robinson's No. 1 Rice, NW Sec. 2-10-9 ..... Location.
Shepard et al's No. 1 Neveas, SE NW SW Sec. 3-12-10 .. Shut down 3,690 ft.

OKLAHOMA COUNTY

Citizens Oil Co.'s No. 1 Sage-Barber, NE cor. Sec. 21-11-3w ..... Shut down 1,200 ft.
L. C. Hivick's No. 1 Sunset Addition, NW SW NW Section 17-11-3w ..... Shut down 5,515 ft.
J. F. Cuniff, trustee's No. 1 Church Land, NE NW SE Sec. 17-12-4w ..... Shut down 6,700 ft.

PAWNEE COUNTY

Rookstool's No. 1 Wylie, NW NE SW Sec. 6-20-5 ..... Shut down 1,950 ft.
Sperry et al's No. 1 Mullrap, SE SW Sec. 2-22-5 ..... Shut down 1,740 ft.
Cochran et al's No. 1 Green, NE cor. SW Sec. 15-23-5 .... Rig.

PITTSBURG COUNTY

J. Morrison's No. 1 Fowler, NE SE Sec. 13-7-17 ..... Rig.
C. Kennedy's No. 1 Travis, C SW NE Sec. 15-7-14 ..... Rig.
C. Canady's No. 1 Jones, NW cor. Sec. 14-8-14 ..... Rig.

POTTAWATOMIE COUNTY

J. E. Crosbie et al's No. 1 Brown, NE NW SW Sec. 2-9-4 ..... Drlg. 3,900 ft.

ROGER MILLS COUNTY

Ute Oil Co.'s No. 1 Williams, C SW Sec. 23-12-24w .... T. D. 3,475 ft.; drlg.
L. C. Hivick's No. 1 Davis, C NW NE Sec. 4-11-26w .... Shut down 2,905 ft.

SEMINOLE COUNTY

Sunray Oil Co.'s No. 1 Sunday, NW SE Sec. 35-5-5 ..... Location.

STEPHENS COUNTY

Junior Oil Co.'s No. 1 Thompson, CNL SE SE Sec. 1-1-7w ..... Shut down 3,329 ft.
Ross Southard's No. 1 McKinney, NE cor. Sec. 25-1-8w .. Shut down 1,062 ft.

WASHITA COUNTY

Cooper & Terhune's No. 1 Blocker, NW cor. Sec. 29-8-19w . Shut down 1,440 ft.
Burns & Prince's No. 1 Deck, SW cor. Sec. 21-8-18 ..... Shut down 100 ft.
Petroleum Holdings, Inc.'s No. 1 Musie, NW cor. Sec. 10-9-20w ..... Shut down 280 ft.

WOODWARD COUNTY

Prairie Oil & Gas Co. et al's No. 1 Wilbur, NE cor. NW Sec. 22-23-17w ..... Shut down 7,445 ft.

OKLAHOMA PANHANDLE

TEXAS COUNTY

Three Way Oil Co.'s No. 1 Crane, SW NW Sec. 11-1-18 ..... Shut down 4,425 ft.
Palo Alto Oil Co.'s No. 1 Graves, NE SW SW Sec. 23-2-18e ..... Spudded; shut down.

SOUTHERN OKLAHOMA

ATOKA COUNTY

Stewart-Howland's No. 1 Howard, NW SE NW Sec. 6-4s-11 ..... Shut down 100 ft.
Brookshire's No. 1 R. W. Rowland, NW NE SE Sec. 18-3s-10 ..... Shut down 400 ft.

BRYAN COUNTY

Bryan County Oil's No. 1 Childs, NW SE SW Sec. 7-7-10 . T. D. 650 ft.
Bush et al's No. 1 Commerce Trust, NE cor. Sec. 35-6s-9 ..... Shut down 690 ft.
Johnson et al's No. 1 Ussery, SE SW SE Sec. 14-16s-7e .. Shut down 485 ft.

CARTER COUNTY

Campen-Lasater Co.'s No. 1 Anderson, NE cor. SE NE SE Sec. 32-4s-2 ..... Shut down 2,806 ft.

COTTON COUNTY

Gilbert-Lowery's No. 1 Harneg, C SE SE Sec. 4-2S-11w .. Shut down 1,492-95 ft.

JEFFERSON COUNTY

C. V. Chenault et al's No. 1 Grogen, SW NE SE Sec. 15-7s-6w ..... Location.
Smith's No. 1 M. O. Carty, SE NW NE Sec. 18-4s-8w ... Location.

LOVE COUNTY

Batson & Sterrette's No. 1 Dillard, SE NE NW Sec. 25-6s-3 ..... Show 5 bbls. 1,585-96 ft.; T. D. 1,433 ft.; P.B. to 1,604 ft.
Hobbs et al's No. 1 Roberts, NE cor. SW Sec. 20-6s-3w .. Shut down 3,130 ft.

MARSHALL COUNTY

D. H. Curry's No. 1 Ward, NE SE SW Sec. 15-5s-6 .... Drlg. 1,443 ft.
McCroy et al's No. 1 Adams, NE SW SE Sec. 21-7s-6 .... Show 10 bbls. 532-40 ft.; 12 hrs.

STEPHENS COUNTY

Andrea et al's No. 1 Patrick, C E half SE Sec. 3-3s-8w .. Drlg. 2,525 ft.
Obermyer et al's No. 1 Skelton, NE SW SW Sec. 32-15-7w ..... Shut down 1,375 ft.

KENTUCKY FIELDS

(Continued from Page 60)

B. and R. L. McManama farm, and has staked a location for No. 5, same farm. Pampas Oil & Gas Co. is starting No. 2 R. C. Stephens farm, Ballantine, Bryan and others are drilling No. 1 Gilford Caroway farm, same field.

Distill-Martin Gas Co. struck a gas well with a volume of 800,000 feet in No. 3 on the Helton farm, 5 miles out from Barboursville, in Knox County, at a depth of 2,100 feet, being the deepest gas well in that area, which is in the southeastern part of the State.

In Hancock County, in the Tri-County Field, D. T. Bolling's No. 3 on the Louis Richards farm, is reported good for 10 bbls. at the shallow depth of 240 feet.

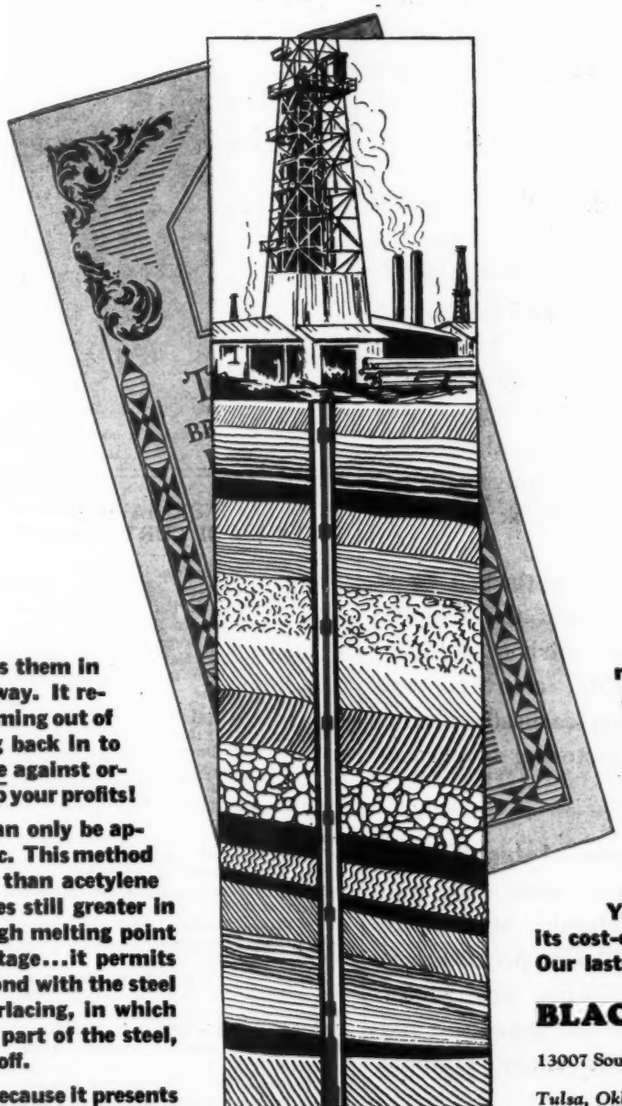
CLEBURNE BONUS FOR WELL

CLEBURNE, Tex., Mar. 7.—Following close on the announcement by the directors of the Cleburne Chamber of Commerce that a $10,000 bonus for a producing oil well within 10 miles of Cleburne would be sponsored by the organization, D. S. Sowell, independent oil dealer of this city, made an individual offer of $10,000 cash bonus for a 500-bbl. oil well within 5 miles of Cleburne, said test well to be completed within one year from date.

H. P. READMON DIES

Harry P. Readmon, 53, purchasing agent of the Chicago Pneumatic Tool Co., New York, for the past 12 years, died February 26.

DRILLING INTERRUPTION INSURANCE



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When you drive into an Humble station, a smiling uniformed service man comes alertly to attention and greets you with a cheery "What can I do for you, sir?"

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He is but evidencing the spirit that is found throughout the Humble organization—a spirit of old-fashioned hospitality, courtesy, and friendliness that earnestly desires to make your motoring as pleasant as possible.

Further evidence of this wish remains with you long after you have left an Humble station. In the smooth, efficient performance of Humble Gasoline and Motor Oil is reflected the character and integrity of the entire Humble organization.

HUMBLE OIL & REFINING CO.

HUMBLE OILS

GULF COAST SHIPMENTS INCREASED BY LARGER MOVEMENT OF REFINED

By Nell Williams

HOUSTON, Tex., Mar. 7.—Shipments of crude and refined products from Gulf Coast ports during January totaled 17,703,439.10 bbls., according to figures just compiled. These represented an increase of 1,945,292.82 bbls. over December when 15,925,114.71 bbls. were lifted. The gain in January was due entirely to a larger movement of refined products both for coastwise and export trade. Shipments of crude dropped off and no export sailings of crude cargoes were reported. Figures by companies and ports were:

Company and port—	Coastwise December	Coastwise January	Export December	Export January
REFINED PRODUCTS				
Standard Oil Co. (La.):				
Baton Rouge	394,845.00	964,192.00	550,565.00	863,028.00
The Texas Company:				
Port Arthur	798,122.00	945,167.00	100,839.00	534,777.00
Gulf Refining Co.:				
Port Arthur	2,010,623.90	2,414,637.48	122,573.75	261,505.74
Magnolia Petroleum Co.:				
Beaumont	1,575,782.35	*2,365,108.59	.....	.....
Humble Oil & Refining Co.:				
Baytown	1,078,985.79	1,039,128.75	1,798,341.11	1,507,657.69
Atlantic Oil Prod. Co.:				
Atreco	26,249.05	.....	.....	.....
Pure Oil Co.:				
Smiths Bluff	365,716.31	395,841.85	.....	.....
Total refined	6,250,324.40	8,124,075.67	2,572,318.86	3,166,968.43
CRUDE				
Standard Oil Co. (La.):				
Baton Rouge	266,912.00	118,836.00	80,050.00	.....
The Texas Company:				
Port Arthur	44,974.00	284,879.00	.....	.....
Gulf Refining Co.:				
Port Arthur	348,402.12	277,387.54	.....	.....
Magnolia Petroleum Co.:				
Beaumont	614,956.66	*625,547.64	.....	.....
Humble Oil & Refining Co.:				
Texas City	536,627.00	478,314.00	.....	.....
Ingleside	131,624.00	167,653.00	.....	.....
Baytown	76,654.00	109,004.00	.....	.....
Harbor Island	2,176,904.00	1,555,395.00	.....	.....
Neches	73,084.00	.....	.....	.....
Atlantic Oil Prod. Co.:				
Atreco	843,409.72	988,529.04	.....	.....
Beaumont	54,105.69	.....	.....	.....
Pure Oil Co.:				
Smiths Bluff	441,036.26	769,138.21	.....	.....
Sun Oil Co.:				
Sabine Pass	1,013,732.00	1,204,680.00	.....	.....
Total crude	7,022,421.45	6,579,363.43	80,050.00	.....
Total shipments	13,272,745.85	14,703,439.10	2,652,368.86	3,166,968.43

*Magnolia Petroleum Co. makes no distinction in reports between coastwise and export shipments.

HOW CALIFORNIA MET PROBLEM OF CURTAILMENT

(Continued from Page 91)

old fields. A total of 755 new wells were completed during 1930, compared to 910 completions in 1929. At the close of the year, there were 220 wells drilling in the oil fields of California, 9 of which were being drilled in search of deeper producing horizons.

Wildcat Activities

The intensive campaign of wildcat and exploratory drilling started in 1929 as the result of the discovery of high gravity oil in Kettleman Hills and at Elwood, was continued during the early months of 1930. Failure of many deep tests to show favorable results and the general policy of major oil companies in particular in reducing drilling operations to a minimum during the period of overproduction, caused a material decrease in the number of wildcat and exploratory wells drilling throughout the State in the closing months of the year.

Wildcat activities have followed very closely the trend of operations in 1928. In the coastal counties of Ventura, Santa Barbara, San Luis Obispo and Monterey, they have been confined wholly to areas underlain by rocks of the lower Miocene and Oligocene age. In the San Joaquin Valley, wildcat drilling has been carried on, not only in areas where Vaqueros and Temblor sands of the lower Miocene were considered to hold possibilities for production but also in areas where possibilities for production have been considered favorable in sands or sandy shale zones in the Santa Margarita formation. During the year, many structures have been definitely eliminated from further consideration by the drilling of wildcat wells. At the close of the year, there were 19 wildcat wells drilling in the Los Angeles Basin, 22 in the coastal districts and 23 in the San Joaquin Valley. Wildcat operations were also being carried on in 24 counties in central and northern California; a total of 42 wells were actively drilling in these counties at the close of the year. While several of these wells have encountered showings of oil or gas and some have produced a few barrels of high gravity oil, no commercially productive fields have been discovered as a result of the recent drilling activities in the central and northern part of the State.

Developments During Year

Significant developments during 1930 were:

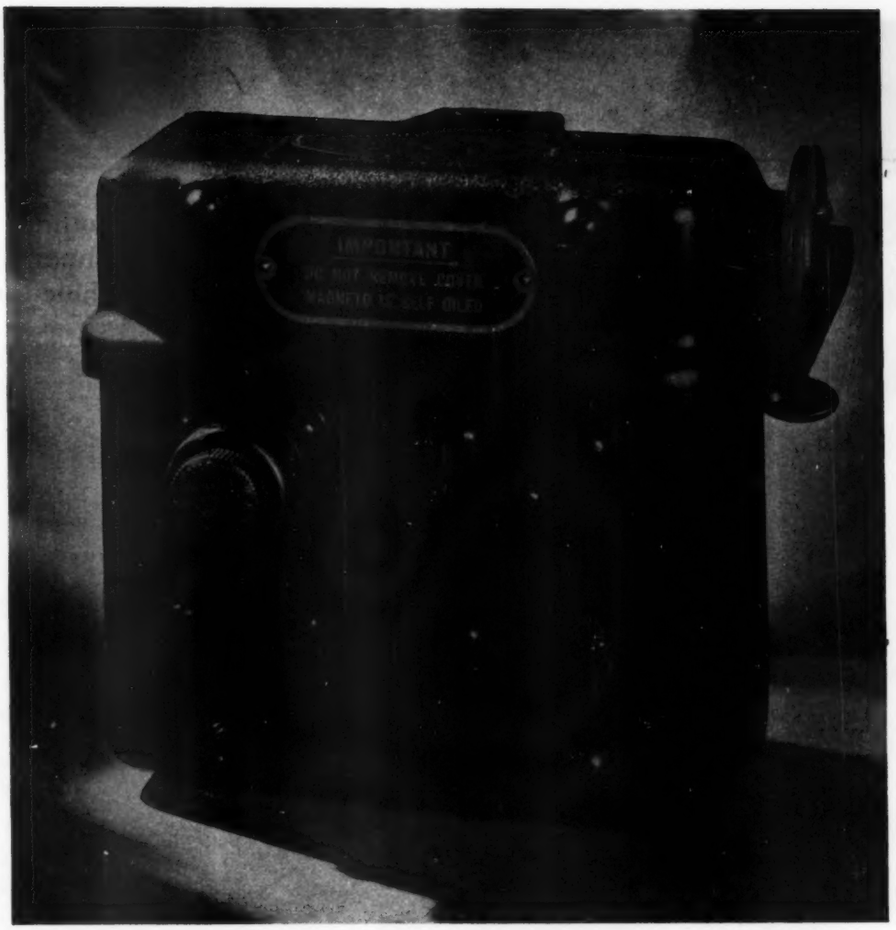
In the San Joaquin Valley: (1) Discovery of high gravity oil in Temblor sands in the North Belridge Field; (2) renewed activity in search for deeper production in the Lost Hills Fields; (3) discovery of normal high gravity crude oil in the Kettleman North Dome Field; (4) discovery of oil in Santa Margarita sands in the Mountain View area southeast of Bakersfield.

In the Los Angeles Basin: (1) Discovery of a deeper producing zone in the West Coyote Field; (2) development of deep zone extensions in the Long Beach Field; (3) development of production at Playa Del Rey in excess of 48,000 bbls. per day.

In the coastal district: (1) Development of westward extension of the Elwood Field into the ocean; (2) extension of the productive thickness of producing oil zone in the Ventura Avenue Field; (3) proving of westward extension of Rincon Field into the ocean; (4) discovery of a probable eastward extension of the Lompoc Field; (5) developments at Capitan, 8 miles west of Elwood.

Exploration Work

A large amount of exploration work was carried on in California during 1930, particularly in the coastal and San Joaquin Valley districts. Geophysical methods of exploration, which had been used extensively during previous years, were on the decline throughout the State during 1930, for the reason that the application of these methods had not resulted in the finding of new fields. The use of airplane photographs for geological base maps had become so general that in several cases companies have shared the expense of flying and photographing a single large area. One area of 2,200



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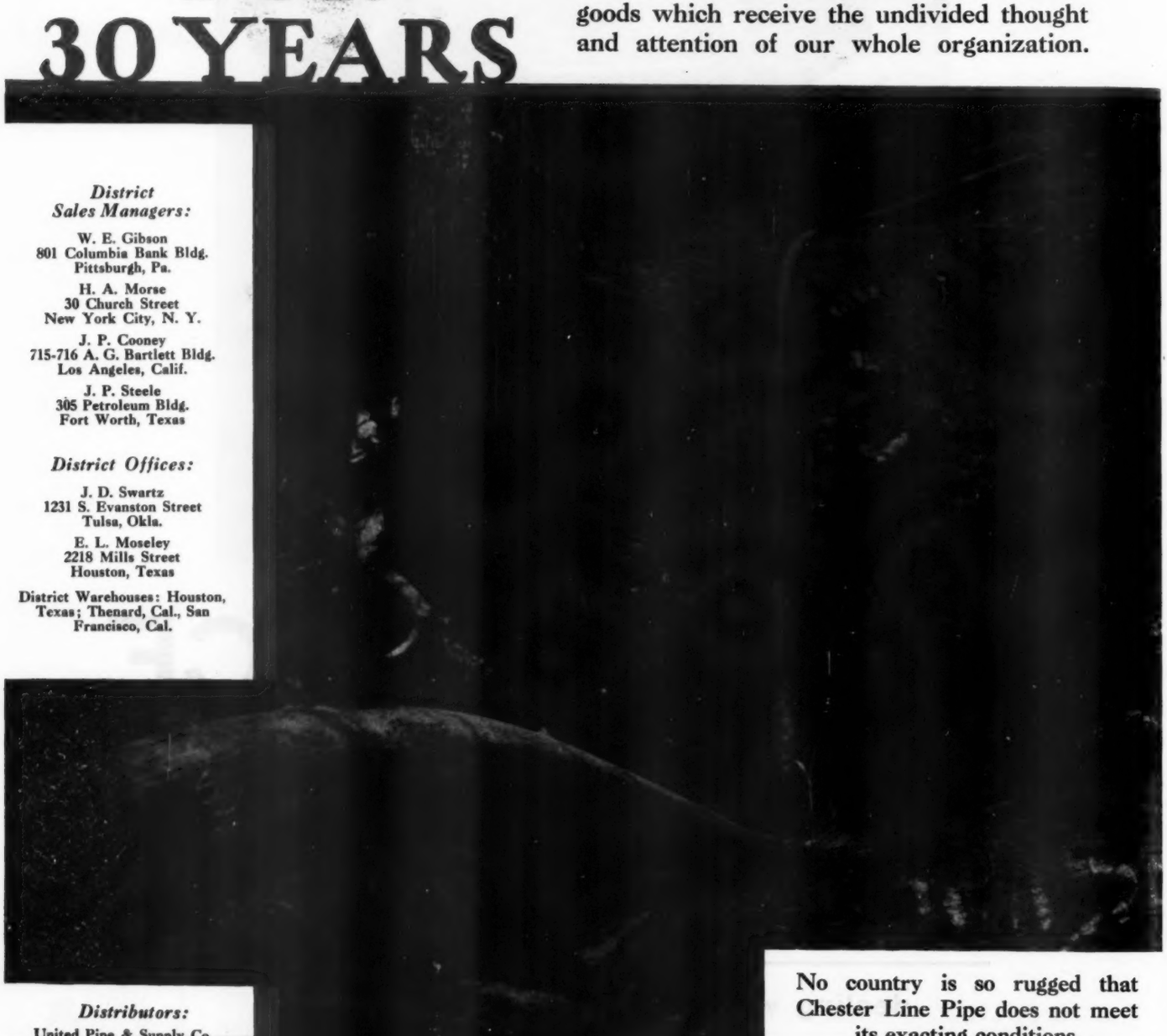

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SPECIALISTS IN CASING FOR DEEP WELL DRILLING

STEEL CASING

LINE PIPE

square miles was photographed by six companies in this manner.

Core drilling equipment and surveying instruments have continued to gain in favor with the operators, and a combination of core barrel and surveying machine designated to orient cores and thus determine dip and strike of beds has been used with some success.

During 1930, there has been continued improvement in the technology of drilling, particular attention being given to the design of rig structures and of equipment for the handling of deep and high-pressure wells. The Standard Oil Co. of California's No. 1 Mascot, near Taft, the deepest hole in the world, was drilled to a depth of 9,629 feet in April, 1930, and a string of 5⅝-inch casing was cemented about 9,350 feet.

General producing methods have improved. Wells are being pumped successfully just short of 8,000 feet, and pumps operating at 7,500 feet are common. Gas injection in partially depleted zones has been practiced in several fields with beneficial results.

The California State Gas Conservation Act, which became effective in August, 1929, did not afford any great measure of relief during 1930. Legal contests in connection with injunction proceedings under this act, for the Santa Fe Springs, Long Beach, Ventura and Kettleman Hills Fields, finally resulted in affirmation by the courts of the constitutionality of the act late in the year. Appeals from the court decisions rendered, however, have further delayed the enforcement provisions of this act.

COLLOIDAL QUALITY FIXES VALUE OF MUD

(Continued from Page 94)

centage of weight admixture that can be used with mud fluids. These admixtures are solids and solids give viscosity. Viscosity increases the propensity to gas-cut and a gas-cut mud may become lighter than water. If natural mud is added to a fluid to increase its weight, however, it very soon increases the viscosity to the maximum allowable limit and still may fall short of the weight desired. A weight admixture can be added in a much less amount to give the desired weight and, because the solid matter is less in volume, the viscosity is kept within the necessary limit. In many cases, however, the mud fluid may have too high a viscosity when extra weight is desired; it must then be thinned and the lighter solids replaced with those in the admixture. It will be well here to settle out the noncolloidal solids so that the resulting fluid will have both the desired properties—colloidal and weight.

Well to Test Weight of Mud

Where pressures are high and a heavy fluid is desirable, it is well to test its weight at frequent intervals. To do this, it has been the custom in some fields to use a bucket and spring scales for weighing the mud at frequent intervals. These are kept available at the ditch as shown in the illustrations. This one was in service in the Long Beach Field and the fluid had just been weighed when the picture was taken. A recently developed device is now being used by some companies to indicate and record the weight of the mud fluid continuously as it is being circulated. An installation is shown in the accompanying photograph, which was also taken in the Long Beach Field. This instrument will probably be of considerable assistance in drilling fluid control, but knowledge of the fluid's actual weight, no matter how gained, will always facilitate the use of weight admixtures.

When any kind of admixture is used, it should be mixed thoroughly and properly with the mud fluid if satisfactory results are to be obtained. The methods may vary with the operator but they should provide availability for constant or intermittent service and should be suitable for different types of admixture. In many cases it is desirable to use a colloidal admixture throughout the drilling of the well and a weight admixture while drilling in certain formations. The Kettleman Hills Field presents conditions where these two kinds of admixture are being used by several companies. This field has many mud troubles to overcome. The wells are of great depth; they have high-pressure gas zones, high-pressure water strata, and thick, porous sand bodies. The clay available in the field is not satisfactory for making mud fluid, so dry mud has to be hauled in. Admixtures are naturally important factors and besides making it possible to get the fluid into a satisfactory condition have also provided economies in the mud mixing.

Popular Type of Mixture

A type of mixer for introducing admixtures into the drilling fluid that is popular in the California fields is shown in the drawing. This is placed on a line leading from the discharge of the mud pump and into the suction pit or into the ditch at a point as near the suction pit as possible. It consists of a cone-shaped, sheet steel hopper placed on the top of a 3-inch tee. The admixture is dumped into this and passes through a hole in a circular plate set in the bottom. The size of this hole regulates the rate at which the admixture drops into the tee. The pipe from the mud pump is 2 inches in diameter but is reduced to 1 inch at the tee. A 1-inch nipple enters the tee through a bushing end and, extending beyond its center, makes the mud fluid from the pump mix with the admixture and jet the resulting mixture into the 3-inch line which leads off from the tee to the circulating system.

Some companies employ cement mixers (of a type similar to those used in oil well cementing) for mixing the admixture with the drilling fluid. These work satisfactorily but are not as convenient for small amounts or for continuous introduction of admixture as the jet mixer. The introduction of the admixture into the fluid seems a matter of little trouble, but it should be done properly in order to get a satisfactory mix and to make sure that every particle will function.

CALIFORNIA'S CITRUS CROP SAVED BY OIL

(Continued from Page 91)

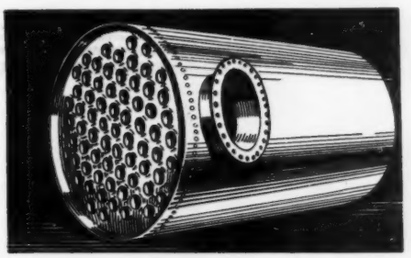
of heater in general use operates on an oil refined to specification both as to the B.t.u. value and gravity, which is usually around 27°. Many of the old type of heaters throw up a heavy smoke screen, but this disagreeable feature is being eliminated by the new type of heater approved for general usage. During the cold spell in December, 1930, the old type of heater created such a volume of smoke in southern California that several municipalities in the orange belt initiated a movement to make it compulsory for orchardists to replace them with smokeless heaters. Orchardists are conducting tests to determine the value of smoke emitted by heaters as a frost preventive and the relative value of heaters that do not smoke. If it is found that the smoke screen is unnecessary, it is proposed to seek legislative action which will require the discarding of all such heaters during the next five years.

Orchardists explain the low temperatures experienced last December by attributing the freeze to an unusual dryness of the soil and the surface air throughout California and particularly in the Southwest. Heat, stored in the surface soil during the day was radiated at night at a rapid rate through the dry air and there was not sufficient moisture in the ground to have much effect in checking the temperature fall when the freezing point was reached. All that was needed to cause frost under these conditions was the presence of an area of high barometric pressure east of the Rockies. The cold spell in December, 1930, was of unusual duration, extending as it did over a period of about 10 days.

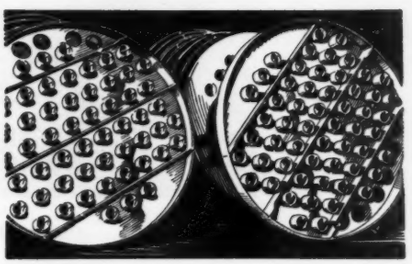
UNION GAS DIVIDEND

CHATHAM, Ontario, Mar. 7.—Union Natural Gas Co. of Canada has declared a regular dividend of 35 cents and special dividend of 5 cents a share on common stock, payable on March 10 to shareholders of record February 28.

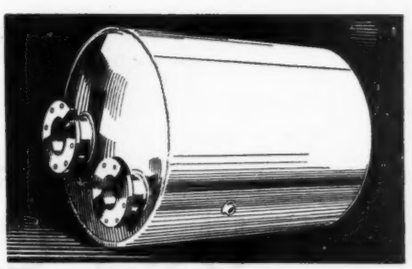
Other metals COST TOO MUCH



Genuine Stainless Steel Air Preheater weighing 8 tons. A remarkably efficient piece of equipment.



700 pound Bubble Cap Trays consisting of four complete sections... Made of Stainless Steel.



4 x 6 foot "Stainless" Tank... All equipment shown was made by Pittsburgh Producers Supply Company.

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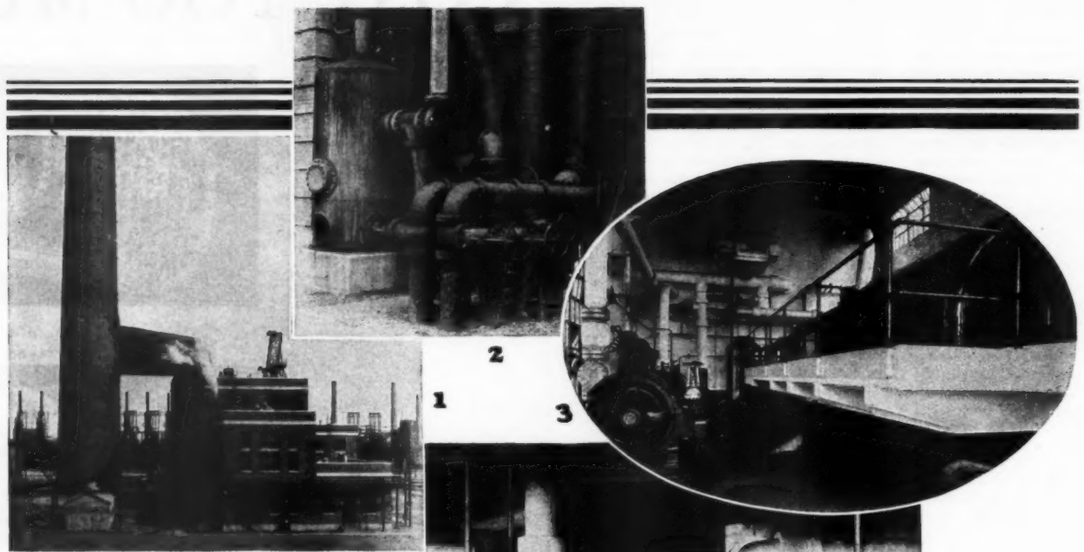

1—New power plant of The Gulf Refining Company, Port Arthur, Texas.

2—Outside steam lines, valve connections and exhausts.

3—Interior of generating room, showing Westinghouse generator and major steam lines.

4—Carey Heat Insulations on steam lines and condensers.

Another Efficient Power Plant
Uses CAREY Heat Insulations

The Gulf Refining Company's new Power Plant at Port Arthur, Texas, is a model of efficiency, as the photographs indicate. Constructed to generate steam at 535 lbs. pressure (Steam temperature, 750°F.), all piping and equipment is insulated with CAREY Hi-Temp No. 12, and CAREY 85% Magnesia.

CAREY Heat Insulations are serving many power plants and refineries in the oil industry, where low costs are so vital. The high temperatures created by modern processes demanded better insulations, and CAREY, with 58 years of successful experience, supplied them. A complete line of heat insulations enables CAREY to give unbiased advice on the correct combination for any condition, and a nation-wide chain of branches and distributors can supply application crews to handle any contract without delay.

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REPAIR SHOP UNECONOMICALLY USED TO MAKE THINGS BOUGHT CHEAPER

By L. G. E. Bignell
Petroleum Engineering Editor

"It's a fine thing to be a good mechanic, but all such should pray not to be led into temptation. A mechanic's very skill may be his undoing.

"'Bill, can you build a coil heater?' 'Sure, it takes more than that to stump me.' 'Can you make a pipe hanger out of this scrap iron?" 'Can you do this or that?' Bill is a real mechanic; his answer is always the same, and he always proves it by doing a bang-up job to win that highest degree of praise, 'It looks as though it came right out of the factory.'

"But Bill forgets, and his boss forgets, that the individual, working by handicraft methods, can rarely compete with the manufacturer operating on a production basis. The mechanic's ability, invaluable for installing equipment and for emergencies and special repairs, earns less than a day laborer's wage for the plant when applied to manufacturing in the style of Robinson Crusoe.

"It is the most natural thing in the world for the skilled mechanic to offer proof of his ability by spectacular feats of handicraft. But a little checking up of actual costs on individual jobs will show it to be an expensive form of amusement.

"Some figure that this is not the case. They report that such and such an article cost $11.62, say, in materials, but that 'labor cost nothing, because the job was done in spare time.' This 'free' labor is the catch. Too often it is the argument dished up by the subconscious mind to justify following our inclinations. Like as not, the job is actually started in a spare moment. Before it is finished it almost invariably infringes on a real job that should have the undivided attention of this man who has the know-how in his fingers.

"There are undoubtedly exceptions to the rule that it is 'cheaper to buy than to make it yourself,' but the burden of proof must lie on the exception."

Applicable in Oil Industry

The above is an editorial by George Edwards, engineer, that appeared in Power and the thought back of it is so true to conditions in the petroleum industry it is felt it is worth while to pass it along.

How often do production companies maintaining repair shops undertake the manufacture of articles that might better be purchased from manufacturers who specialize in this type of apparatus.

Old material is in the yard and a machine shop foreman will undertake to work it up into some piece of equipment that can be used in the field and will usually state that the labor item can be neglected because they had to have the men on the payroll anyway and they might as well be doing this work as loafing.

As a matter of fact the machinists would not be loafing if they were not working upon this special job, and if it is true that business in the machine shop is so slack that the men would be loafing if they were not kept busy working upon special pieces of equipment, it is then a question as to whether it is good policy to longer maintain this department.

The method of cost accounting is the one detail upon which the manufacturer and machine shop foreman will never agree. The foreman of the machine shop does not have to keep the same type of cost records that are required of the manufacturer and therefore there can be no direct way of making comparison between the two methods of manufacturing an article.

This is unfortunate because it works a hardship upon the manufacturer that it is almost impossible for him to combat. If he is too active in his attempt to try to convince the machine shop foreman or the production superintendent that their system of cost accounting is in error because they are not charging against the article all costs that properly should be placed against it, he is looked upon as biased and unfair. If he says nothing the competition continues and probably goes on for a long time before some one actually makes a check that reveals that the article can be bought for less than it can be made in the company plant.

The truth of this statement is borne out by the fact that at one time or another nearly every production company has tried its hand at manufacturing some item of equipment it used in the field, but ultimately it has given up this practice and again returned to buying from a reliable manufacturer.

In the meantime, this loss of business has had its effect upon the manufacturer for his profits in nearly all instances are based upon mass production and any loss of orders works a hardship upon him. It is usually fortunate that only one or two companies have the same idea at the same time about the manufacturing of some article, so the total amount of business lost is not large.

"Home-made" Hobby Costly

Another proof that the manufacturing of articles in a small plant on the lease is unprofitable is the fact that the total volume of such business is very small because the great majority of the users find it cheaper and more convenient to purchase from a company specializing in the particular type of equipment desired rather than attempt to make it themselves.

This "home-made" hobby also has its drawbacks because while it may be quite satisfactory for a small shop to make a particular piece of equipment for a time it will later develop that the pressure of other work is so great that these special articles cannot be manufactured without adding men to the force or increasing the capacity of the plant, two conditions which may be very undesirable.

At this time when every manufacturer is striving to get back to that basis of production where the volume handled will be sufficient to show some profit every little increase in orders helps and it is likewise true that at such a time it is perhaps desirable to try to maintain a machine shop organization on a lease and to do so many articles are made there that otherwise would be purchased.

In fairness to everyone concerned it would seem that at this time the best results will be obtained if equipment and apparatus is purchased from manufacturers who specialize in making it and in this way again bring about the distribution of business so that as many persons as possible may participate in the activity thus created.

As Mr. Edwards said: "There are undoubtedly exceptions to the rule that it is 'cheaper to buy than to make it yourself,' but the burden of proof must lie on the exception," and if actual costs of making in small shops are obtained with all items entering into these costs properly charged it will be found in the vast majority of cases that it would be cheaper to buy than try manufacturing these articles in the company's small plant.

FRIENDLY RELATIONSHIP WITH ITS EMPLOYES

(Continued from Page 94)

which he is making toward self-improvement are added to the original markings. The end kept in view, under this system of record keeping, is the mutually desirable one of enabling the company, on one hand, to obtain the employe's services in his most desirable capacity, and on the other hand to enable the employe to seek his own level, according to his qualifications and his ambition.

To make the system practicable, regular channels are provided through which an employe may apply for transfer to another position or department. The first position in which a man is employed may often be wholly circumstantial, and is not considered to be the limit of his ambition. These applications for transfer are routed through the heads of the departments concerned to the personnel department,

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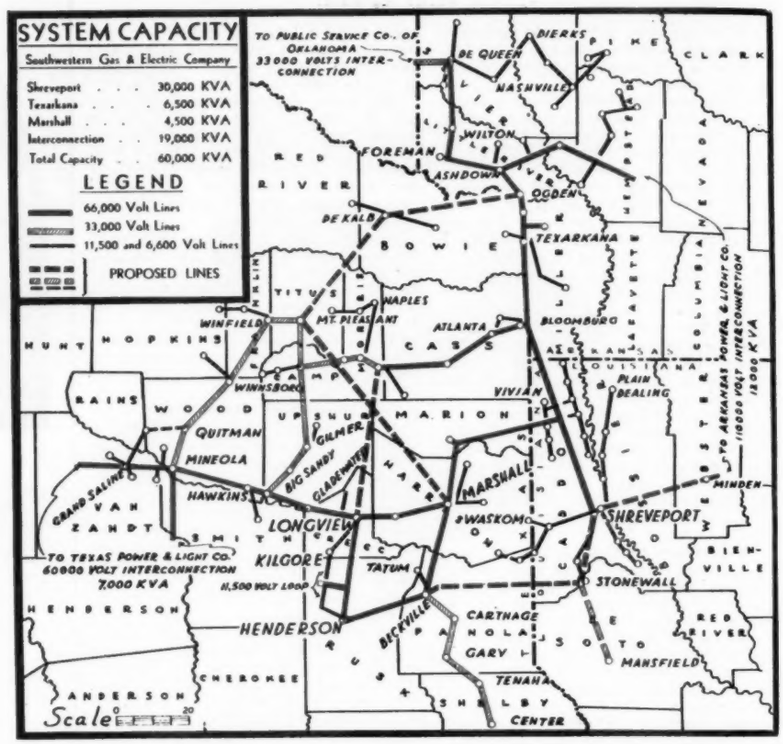

● ELECTRIC POWER IS CHEAP

Rates offered by the Southwestern Gas & Electric Company are among the lowest in the country. The cost for electricity in powering oil field operations in East Texas is lower than for any other form of power. In addition to low rates you have lower installation costs, lower labor costs, greater safety, and far lower maintenance costs. Drilling rigs operated by giant electric motors will shortly be operating in East Texas.

● ELECTRIC POWER IS FLEXIBLE

Our power lines already crisscross East Texas, as shown on the map. On very short notice, lines can be run to any part of any lease, any pipe-line right-of-way, or any refinery site.

● ELECTRIC POWER IS DEPENDABLE

Our transmission line system has the capacity to meet any requirements. It is reinforced and its dependability guaranteed by interconnections with the transmission systems of other companies. Note the "loop" system of transmission as indicated on the map—the most dependable known method of transmitting power cross-country.

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where they are checked against the man's recorded qualifications.

This system of personnel records, coordinated with regular channels of application for transfer, has been developed by co-operation between operating officials and the personnel department to such an extent that at present if a refinery department should issue a call for one or a dozen men, the foreman is likely to be furnished not only with the men best qualified for the new work, but those who most desire to be given a chance at it. The problem of the square peg in the round hole is thus reduced to a minimum.

Correspondence School

In a further effort to assist the employe toward self-improvement, the company has established a school which furnishes correspondence instruction in a number of subjects at a nominal charge. The courses are of two general classes, one being in fundamental and general subjects, such as English, mathematics, etc., and the other in subjects peculiar to the oil industry and this company, such as "The Petroleum Industry," "Company Products," "Company Accounting," etc. When a man finishes a course creditably, it is noted on his personnel record, but it is of course understood that a man's study will benefit his progress not by any automatic recording of the fact, but by its reflection in the increased quality and efficiency of his work, which is the only basis for advancement.

The ordinary hazards of industry, and the extra ones incidental to the handling and refining of oil have caused a great deal of attention to be given to safety and health. The company maintains several well-equipped and efficiently staffed emergency hospitals, and has a visiting nurse system at the larger plants, but the main effort is preventative. By a consistent and studied effort, based on hearty co-operation between expert safety men and the heads of the various operating departments, lost-time accidents have been reduced to an astonishingly low figure. The subject of safety is by no means the exclusive concern of the personnel department. By proper methods of education, a point of view has been developed by which the safe operation of a refinery department is considered as serious a responsibility of the foreman as his regular production duties.

Foremen's Meetings

A series of foremen's meetings are held at the refineries, at which discussion is not confined to departmental operations, but includes problems of personnel, with the emphasis on safety. The foreman is considered the key man in safety work, for the reason that much of the hard effort of the safety engineers toward elimination of hazards and education in safety methods is of little avail if it does not reach the employe at the point of contact with those who supervise his work. This does not mean that no effort is made to reach the workman directly. On the contrary, he is the direct objective of a constant, uninterrupted campaign of safety education. Further, selected employes are given a comprehensive course in first aid, supervised by experts from the United States Bureau of Mines. This work has proved valuable, not only in reducing chances of serious injury within the company, but has been the means of gaining much good will for the company on numerous occasions when employes trained in first aid have been able to assist injured persons on occasions away from duty.

All these are but the high-lights of the company's personnel policy. Good working hours and conditions, education, careful record-keeping and opportunity for advantageous transfers, sick benefits, life insurance, pensions and the safeguarding of a man's work are but the chief expression of a system which has its chief base on co-operation and mutual confidence. The company's policy is not patronizing, nor charitable in the sense that it in any way infringes upon a man's normal independence or self-respect. On the contrary, it increases it by recognizing that the company and the employe have certain interests in common, and by inviting the employe to assist in obtaining them. The policy has brought to the company a high type of employe in every capacity. There can be no labor troubles in an organization of intelligent employes who recognize this community of interest. These activities of the company require the operation of an entire department devoted to personnel work, as well as considerable time of operating executives. The employes realize this, and realize further that what benefits the one in a constructive manner, benefits the other. In short, it is recognized by both company and employe as sound, good business.

ONE KETTLEMAN GUESS IS GOOD AS ANOTHER

(Continued from Page 100)

rates of production, as measured in oil alone, we have the corresponding years:

30,000 Bbls.	150 years
50,000 Bbls.	90 years
100,000 Bbls.	45 years
250,000 Bbls.	18 years

We do not know now what rate of production there will be in the future. Any specified amount can of course be maintained against decline by the drilling of new wells.

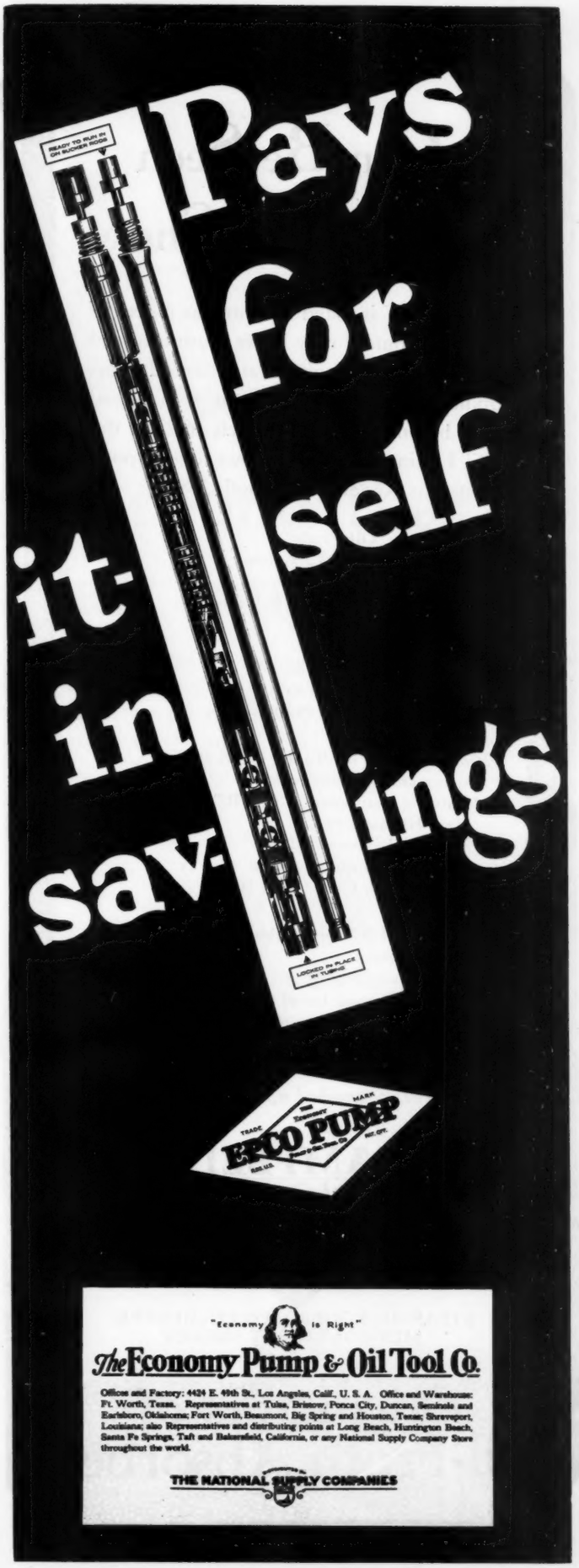
More dancing, more singing, more music by the lyres. Leave it to the geologists, the engineers, and their stenographers.

In our conservative moods it is safe to assume that our profile of the region at the North Dome would appear as in Figure 1. Our certain knowledge of the fold is confined to the almost flat top and a short distance only down the flanks. Beyond this section we know nothing. That is why we draw the figure as simply as possible. No misleading information is given and no false hopes are aroused. Our motto is, "What we do not know does not exist." Strata of Etchegoin age appear at the surface of the dome. To the right the valley alluvium covers all. At depth is the brown shale underlain by the Elliott and Ochsner zones of the Temblor. Numerous lines between the highest and lowest strata are omitted. If we knew where to place a line between the Etchegoin and the Jacalitos, the latter overlying the brown shale, we would have put it in, and some gas and oil should be shown here in these post-brown shale formations.

Like a Huge Layer Cake

The Temblor formation, as previously noted, is made up of numerous strata differing in porosity and permeability. It appears as a huge layer cake, though no attempt to show this feature is made in the drawing. The upper zone bears the symbol of wet gas and condensate. Possibly normal oil should appear between this accumulated deposit and the water which occupies all off-dome portions of the zone. In the lower zone such normal oil appears. At the top is again wet gas and condensate. The entire drawing is purely diagrammatic; we must take it so in the belief that our knowledge is scant concerning these details. At some distant date we can draw more accurately. With numerous strata in each zone some will reveal different proportions of wet gas, condensate and even normal oil, while the edge water will appear at various levels in the different strata. Wherever the contacts between hydrocarbons and water may have been in the beginning, and wherever they may be now, it is certain that they will be farther up the structure in the future, higher in those strata which are most permeable. The outermost wells seem already to have encountered edge water in some of these strata. For these of course there will be continued production, but water troubles will gradually increase.

The encroachment of edge water is considered by many as an unnecessary evil. It is just the opposite in the fields of California. We cannot withdraw gas and oil without allowing water to take its place. It is true that expanded gas occupies more space than compressed gas, and thus for a time during the first expansion the edge water does not move, but this period of first expansion does not exceed a year on the North Dome. For all the years to follow the water will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*Floating Roofs for Tanks ("C & B")
Fractionators ("Oil-Froth")
*Gauging Equipment ("C & B")
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*Integral Floats ("C & G")
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May Drill Costly Holes

If the acreage of the field is 25,000, edge wells must go down 9,800 feet to touch the top of the Temblor, and 1,400 feet of penetration requires 11,200 feet of penetration. This is not an impossibility in future drilling, but why drill such costly holes? The gas and oil will continually pass up the flanks of the structure during production from wells of higher location. We shall not leave these fluids in the ground in failing to drill the outlying wells. Perhaps it would be convenient and expedient to learn the extent of the field in the near future. If such knowledge is worth the cost we are free to make the expenditure. To be sure an owner of an outlying piece of ground wants his share of the gas and oil. Somewhere down the flanks a deep well will be able to return the money invested in drilling and no more; farther down a deeper well cannot pay out. We do not know where to place this "pay line." Where scientists would not ask for the necessary expenditure to locate the line, economists and operators may do so.

Alas, there is so much we do not know. Is that any reason for refusing to speculate upon possibilities now beyond our knowledge? Drilling, with the aid of micropaleontology, may reveal things in this general region as yet unsuspected. The fold shown in Figure 1 is simple. It may instead be complex, as shown in Figure 2. A subordinate structure parallels the main one, and on its top there is provided an anticlinal trap for the accumulation of gas and oil. We would not expect this lateral fold to be as long as the main one; it is merely a secondary "buckling" in the formations which would likely be formed simultaneously with the main one, both being due to the same lateral push originating with the upheaval of the mountain ranges bordering the region on the southwest. Folding of this sort is not unknown; the Teapot Dome in Wyoming is just such a secondary fold at the side of the main Salt Creek Field anticline. It is true that many faults there exist in the syncline and up the sides of both folds. We have pictured no breaks of that nature in the present case, though of course they may exist.

Another Possibility

Another possibility is shown in Figure 3. A buried thrust fault lies to the right of the main dome. Longitudinal faulting is, as we say, admitted as a possibility. There is some evidence of such on the sides of the main fold just off the top. The diagram shows an upthrow of Temblor, bringing the formation again within reach of the drill. Perhaps there would be a drag on such a fault, so that there would exist a slight anticlinal fold to the right of the break. In that case accumulation would not depend altogether upon a sealing of Temblor against shale. The fold in itself would act competently as a trap for gas and oil. A thrust fault would likely be of the same age as the fold, folding and faulting being due to the same lateral pressure. Accumulation provided by faulting then took place subsequent to such faulting. But the future may reveal normal faulting, wherein the arrows in the drawing must be shown in the reversed directions. Instead of a throw favorable to the drill there is one unfavorable.

A normal fault is the result of tension; such would consequently be subsequent to the fold, and accumulation might have taken place either before or after the break. If before, we need expect no accumulation lost to us because the drill cannot go sufficiently deep. If accumulation took place after normal faulting, or, as we say, necessarily after thrust faulting, we face the possibility of leakage along the fault to porous strata of Etchegoin-Jacalitos age within easy reach of the drill. Thus in finding this oil we would not know whether the deposit is a primary one or a secondary one. Perhaps that would be immaterial to us.

All on Trap-Forming Structures

It is interesting to note here in connection with accumulation that all our important oil fields in the world occur on anticlines or on other "trap-forming" structures, small structures on the flanks of great geosynclinal basins. Evidently the basins served as a gathering ground. We are led to suppose that oil in small globules and gas in small bubbles have been pushed along by water acting over great areas, the pushing being a slow process requiring perhaps centuries and ending for each globule and bubble only when these have happily lodged in the trap where the water can no longer move them. Instead the water moves onward at the base of the trap, bypassing the trapped fluids of lighter specific gravity. The laws of migration and accumulation, like those of production, are matters pertaining to the science of motion. The science of motion is old. We call it theoretical mechanics. Galileo started it; Newton completed it; now it is our problem to shape our containers to the contours of geological structures and to fill these containers with a porous medium, oil, gas and water. A complex problem, but not a difficult one.

We have neglected an important characteristic of folding in our three diagrams. A fold as large as that of the North Dome, in all probability, was not formed over night. Time was required to bend the strata into their present shape. How much time was required? The safest answer would be to say, "All the years subsequent to Miocene time." An earthquake in a nonvolcanic region occupies a few seconds, but the strains, which become adjusted at the time, are due to stresses through many years. As with earthquakes, so it often is with folds, with the result that we have successive bendings throughout ages.

Time Makes Permanent Curvatures

In speaking of movements in the earth's crust one geologist has said, "Once a line of weakness, always a line of weakness." We are inclined to believe that "always" may be too long a time; nevertheless the idea is clear. And whether the result is bending alone or bending with faulting is a matter dependent upon the competency of the beds to withstand a strain without cracking. Here we may mention that rock which appears brittle in hand specimens often is either elastic or plastic in large bodies. A short strip of glass is stiff and brittle, yet a longer piece of the same section can be bent into a loop. Given time in a curved position it will take on permanent curvature.

Successive folding, accompanied by continued deposition, results in the stratigraphic conditions shown in Figure 4. Here beds of post-Brown shale age are not uniform in thickness, but feather out toward the fold. Sealing of sands by shales, providing for gas and oil traps, is a probability. Off the dome, then, the drill may find still another class of deposit, as indicated in the diagram. It is evident that the continued folding suggested here will provide a series of these "buttress sands" on upward to the surface, and this feature is ignored in the present drawing.

Regardless of our attitude toward the other drawings, this one certainly deserves our attention, for these conditions exist beyond doubt in the West Side Coalinga Field and on the east flank of Buena Vista Hills, areas within the same geophysical basin and not remote from the dome itself. In the former field the buttress sands feather out toward an outcrop in the immediate hills. Many have felt that asphalt, as a residue of evaporated oil, has prevented the escape of oil lower down in the formation, but this seems very improbable in the light of known buttress conditions.

At Buena Vista Hills

At Buena Vista Hills we know from micropaleontological examinations that production off the dome proper is coming from beds not only which are stratigraphically higher than those on the dome, but also which are entirely absent on the dome.

As to the immediate vicinity of the dome we do not know whether the gas at Dudley Ridge is from uniform beds which extend over the dome or from beds as

The Darling Reporter asked . . . . . "Have you found that Darling Valves last longer?"

"Yes, we have—though we don't know just how long Darlings do last. We've had that first one on the line over there for a great many years. It's still in first class condition and we expect it will be as long as we have use for it. We're using Darlings on all new work and for all replacements, so you know we must think that they'll stand the gaff of long, hard service."

Soundness and simplicity of mechanical construction insure the long life of Darling Valves — for they do stand up under adverse conditions.

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* The Audit Bureau of Circulation—standard gauge of all media circulation is usually designated as A. B. C.

The OIL and GAS JOURNAL

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shown in this drawing. All we can say is that Figure 1 does not provide for this accumulation, whereas any one of the last three does so. Furthermore, we have the case of the Bolca Chica Ferguson well. Most geologists believe that the Brown shale was not penetrated; some few do believe so. Possibly this well hit a buttress sand as here shown. Who knows today?

Our four drawings do not cover all possibilities. Others are conceived as combinations of 2 and 3, 2 and 4, 3 and 4, and 2, 3 and 4, with variations as noted or implied. Such combinations do not require further elaboration; they only make a complex situation more complex.

Well, we know how the Kettleman Hills Field appears from the air today, but we do not know how it will look 10, 25 or 50 years from now. However, we may feel about this area, we must admit that nature holds many subsurface secrets from us and the surface can only be visualized as these secrets become known. The field is very great, and also very young.

Now for the lyres once more and let us all join in.

GETTING CALIFORNIA SHOW IN READINESS

(Continued from Page 99)

ment and Engineering Exposition is the only large show to be held during 1931, special efforts have been made by the manufacturers to present all of the newest designs for the attention of visitors. Many pieces of equipment are to be introduced for the first time and several companies have rushed the completion of designs in order to have them ready for the show.

Materials and foundry work will be widely displayed and the technical features of the metals used will be presented.

Drilling Rig in Operation

The drilling department of the industry will be well covered with every type of equipment from steel derricks down to the smallest piece of hard facing material being shown. On the outside space a complete rig will be displayed in a derrick with all necessary equipment. A drilling rig will be in operation in the main building. This, being of the hydraulic type, will include the controls, rotary table, drawworks and steam engine. The engine itself will be operated by an electric motor but will function completely as a prime mover in the operation of the drawworks and rotary table. In addition to the rig equipment which will be shown by various manufacturers, many pieces of drilling equipment will be displayed with cutaway sections or in unassembled form. Every type of steel rotary hose now being manufactured will be on display, the various features of each being seen.

Boiler installations will be on the outside spaces. Boiler insulation will be shown both in the building and outside.

Rotary hole equipment will be given wide attention and many manufacturers will show their bits, core barrels, cement equipment, fishing tools, underreamers and all other rotary hole tools.

All types of producing equipment will be conveniently presented. Complete pumping units, including walking beams, have been set up and will be in operation. These will include types using the different prime movers and will cover all applications for the various conditions encountered in all parts of the world.

For Natural Gas Industry

Equipment for use in the natural gas industry receives much attention. All types of meters, regulators, orifice fittings and pipe will be shown in detail. Some of these displays will be elaborate and cutaway sections of fittings will give the visitor an excellent idea of operation. Both high and low pressure valves will be displayed in profusion and many valuable features together with the latest developments for use in every kind of operation and for the elimination of danger will be shown.

Both the refinery and natural gasoline industries are arousing greater interest than usual. All types of recording and control instruments will be on display and many examples of typical hookups will show the effectiveness of control apparatus. Both electrical and air-operated temperature and pressure controls will be exhibited together with pyrometers, recording and indicating thermometers, pressure gauges, float valves, etc. Several companies are displaying new anticipating temperature controls.

Besides several types of cooling towers, among which will be one of new design, there will be shown also all kinds of plant accessories. Several makes of oil and gas separators will be on display and many of these, together with absorbers and similar equipment, will be presented with glass models to show their internal operation under actual working conditions. The chemical phase of this department of the industry will be represented.

Prime movers for every branch of the oil industry will include those driven by gas, gasoline, steam and electric power. Many improvements in spark-proof motors will be shown and the great attention being paid to the elimination of fire hazards will be clearly indicated.

Tubular Goods

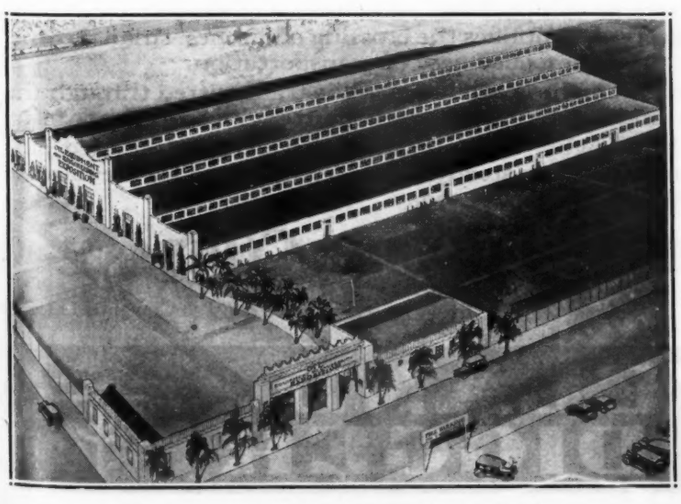
Tubular goods of all types will include tubing, casing, perforated pipe, screen pipe and line pipe. Many new types of joints will be shown and the application of A.P.I. specifications will be clearly demonstrated. Perforating and slotting machines will be in actual operation throughout the show.

Instruments besides those mentioned will include those for weight indication and weight control. A varied line of well survey instruments will be featured and the methods being used for direction determination will include pipe orientation, the gyroscope and the magnetic compass. Each of these types has been used successfully and the construction and application of the instruments will be found of interest.

Welding equipment will be presented for both arc and gas welding. It will include torches and generators together with all of the latest rods and accessories. Diamond hard material for the facing of bits and other cutting edges will be shown by several companies. These will include both the inserts and the compounds and will offer the visitor valuable information in regard to overcoming abrasion.

Various kinds of accessory equipment, the knowledge of which is so valuable to the oil man, will be shown by various companies. These will cover brake linings, valves, pistons, grinding tools, pipe coatings, insulating materials, and a host of others. Such displays always receive the close attention of the visitor and have frequently done much to solve many of his problems and to increase the efficiency of his operation. The specialty tools alone will warrant several visits to the show.

In order to obtain the maximum results, free admission has been provided for everyone connected with the oil industry so that all may visit the exposition as frequently as is desired or convenient. In this way every piece of equipment can be given a thorough examination.



Oil Equipment and Engineering Exposition, Los Angeles.

ALBERT S. ALSTON DEAD

Albert S. Alston, age 40 years, assistant to the vice president and general manager of the Texas Corporation of California, died at his home in Los Angeles on March 3.

Mr. Alston was a native of Dallas, Tex., and had been connected with the Texas company since May 1, 1908, during which time he was located in Houston, Port Arthur, Dallas, Tampico, New York and Los Angeles.

He is survived by his wife, Mrs. Catherine Alston; one son, Albert Alston, Jr., both of Los Angeles.

LOUISIANA-ARKANSAS PROVEN AREAS

(Continued from Page 46)

RICHLAND PARISH

Ark.-La. P. L. Co.'s No. 5-C Thomason, 350 ft. S, 217 ft. E, SW cor. NE NE, Sec. 21-16-6e.—Began drlg. Mar. 3; drlg. 50 ft.

Richland Operating Co.'s No. 1 Cooper, 600 ft. N, 600 ft. W, SE cor., Sec. 13-16-6.—Began drlg. Feb. 24; cmtd. 12½-in. 192 ft; drlg. 750 ft.

Southern Carbon Co.'s No. 1 J. O'Neal, 660 ft. N, 760 ft. E, SW cor., Sec. 36-17-6e.—Location.

Southern Carbon Co.'s No. 2-B Thomason, 1,980 ft. S, 2,080 ft. W, NE cor., Sec. 23-16-6.—Cmtd. 6-in. 2,285 ft.

United Carbon Co.'s No. 2 Cooper, 660 ft. N, 3,551 ft. E, SW cor., Sec. 13-16-6.—Location.

United Carbon Co.'s No. 1 Lindow, 1,980 ft. S, 37 ft. E, NW cor., Sec. 15-16-6.—Drlg. 1,530 ft.

SABINE PARISH—ZWOLLE

Bradley Drlg. Co.'s No. 1 Newton, 600 ft. W, 600 ft. S, NE cor. NW SE, Sec. 25-8-12.—Cmtd. 6⅝-in. 2,316 ft.

W. M. Coats' No. 2-A Sabine Lbr. Co., 330 ft. S and E, NW cor. NW SW, Sec. 1-7-12.—Began drlg. Feb. 26; cmtd. 10-in. 100 ft; drlg. 500 ft.

W. M. Coats' No. 3 Sabine Lbr. Co., SW cor. SW NW, Sec. 1-7-12.—Bldg. derrick.

O. A. Gautier et al's No. 1 Mischell, 330 ft. E, 150 ft. N, SW cor. SE NW, Sec. 30-8-12.—Fishing D.S. 1,800 ft.

Ab Jones et al's No. 1 Ferguson, 330 ft. N, 330 ft. W, SE cor. NE SW, Sec. 33-8-12.—S.D.; W.O. 2,528 ft; S.O.

Lacy Prod. Co.'s No. 3 Cooper, NW cor. SW NE, Sec. 30-8-11.—Location.

Loring Oil Co.'s No. 16 Bowman-Hicks, approximately 1,000 ft. S, 330 ft. E, NW cor., Sec. 9-7-12.—Rig up.

Ohio Oil Co.'s No. 6 Bowman-Hicks, 300 ft. N, 265 ft. W, C, Sec. 2-7-12.—W.O.S.R; 1,800 ft. fluid 2,509 ft.

Ohio Oil Co.'s No. 7 Bowman-Hicks, 250 ft. N, 1,370 ft. E, SW cor. NW NE, Sec. 2-7-12.—Began drlg. Mar. 3; cmtd. 10-in. 100 ft.

H. W. Perritt's No. 2 Bowman-Hicks, NW cor. SE NE, Sec. 2-7-12.—S.D; W.O. 2,275 ft.

H. W. Perritt's No. 3 Bowman-Hicks, 244 ft. S, 122 ft. E, NW cor. SE SW, Sec. 2-7-12.—Drlg. 1,865 ft.

J. M. Tompkins' No. 1 M. R. Stoker, 300 ft. S, 100 ft. W, NE cor. SW, Sec. 10-7-11.—Tested dry; arranging to deepen to 2,520 ft.

Triangle Pet. Co.'s No. 2 Sabine Lbr. Co., 330 ft. N and E, SW cor., Sec. 36-8-12.—Location.

J. C. Walton's No. 1 Sabine Lbr. Co., 300 ft. S, 300 ft. W, NE cor. NW, Sec. 11-7-12.—S.D. 1,930 ft.

SABINE PARISH—PLEASANT HILL

John Henry O. & G. Co.'s No. 2 Cooke Land Co., 1,990 ft. S, 1,640 ft. E, NW cor., Sec. 34-10-12.—Tested S.W; S.O; arranging to deepen; 3,310 ft.

WEBSTER PARISH—SAREPTA

Cassidy & Davis' No. 1 Nickerson, 300 ft. S, 300 ft. W, NE cor. SW, Sec. 29-23-10.—S.D. 150 ft.

ARKANSAS

OUACHITA COUNTY—SMACKOVER

L. H. Hamilton's No. 3 Doyle, 100 ft. E, 400 ft. N, SW cor. SE SE, Sec. 23-15-16.—Junked and abd; skidded 40 ft. west; began on second hole Feb. 25; cmtd. 10-in. 42 ft; drlg. 1,820 ft.

OUACHITA COUNTY—STEPHENS

J. D. Reynolds' No. 1 Grayson, Sec. 21-15-15 (Stephens Townsite).—Cmtd. 6-in. csg. 2,150 ft; T.D. 2,190 ft.

Wesson & Bonner's No. 1 Wesson, 500 ft. W, 175 ft. N, SE cor. SW NW, Sec. 22-15-19.—Setting packer to cut off wtr. flow 2,169 ft.

UNION COUNTY—CHAMPAGNOLLE

Ohio Oil Co.'s No. 3 Furlough, 408 ft. N, 192 ft. E, SW cor. NW NE, Sec. 12-17-14.—Derrick.

Ohio Oil Co.'s No. 2 Raulston, 330 ft. S, 330 ft. E, NW cor. NW SE, Sec. 12-17-14.—Derrick.

Ohio Oil Co.'s No. 5 R. Pumphrey, 660 ft. S, 660 ft. W, NE cor. NW, Sec. 12-17-14.—W.O.S.R; to pump 3,011 ft; 1,500 ft. fluid.

UNION COUNTY—EL DORADO

Rice Drlg. Co.'s No. 1 Watley, 150 ft. S, 150 ft. E, NW cor. SW, Sec. 7-17-15.—S.D; repairing rig; T.D. 1,520 ft.

Southern Prod. Co.'s No. 1 Wingfield, NE cor. SE NW, Sec. 16-19-15.—Drlg. shale 2,060 ft.

UNION COUNTY—URBANA

Marine Oil Co.'s No. 1-E Thompson, 330 ft. N, 330 ft. W, SE cor. NW NE, Sec. 10-18-13.—Rigging up.

Marine Oil Co.'s No. 2-E Thompson, 330 ft. N, 330 ft. E, SW cor. NE NE, Sec. 10-18-13.—Location.

EAST TEXAS

HARRISON COUNTY

Calatex O. & G. Co.'s No. 6 Argus, 755 ft. N, 699 ft. W, Mile Post 27, in J. Womack Sur.—Location.

PANOLA COUNTY

Ark.-La. P. L. Co.'s No. 13 Louis Werner, 1,590 ft. S, 600 ft. W, SE cor. Carrie Steele tr., B. C. Jordan Sur.—Drlg. lime 2,520 ft.

Daisy O. & G. Co.'s No. 1 Rucks, John Palmer Sur.—Drlg. 2,200 ft.

Dillon & Bradham's (was W. G. Banks et al's) No. 1 C. O Baldwin, 1,395 ft. W, 1,362 ft. S, NE cor. Baldwin 290 ac. in Hampton West Sur.—S.D. 905 ft.

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S. E. Bell et al's No. 1 Burnett Lbr. Co., C, S. B. Hendricks Sur. ..... Drlg. 3,188 ft.
C. D. Neff et al's No. 6 Brumble, B. C. Jordan Sur. .... Derrick.
Knox et al's No. 1 Dunham, Chas. Haley Sur. ..... S.D. 3,110 ft.
United Prod. Corp.'s No. 17 Steele, 1,320 ft. N, 660 ft. W, SE cor. C. D. Steele lse. in B. C. Jordan Sur. .... Location.

MISSISSIPPI

HINDS COUNTY

Cleve Love et al's No. 2 Ridgeway-McGhee, SE cor. NW, Sec. 2-5-1e ..... Rigging up.
Love Pet. Co.'s No. 2 Maley, 700 ft. E, 1,100 ft. S, NW cor. NE NW, Sec. 15-5-1e ..... Cmtd. 10-in. csg. 700 ft.
Pirtle & Flint's No. 1 Payne, 450 ft. W, 50 ft. N, SE cor. SW SW, Sec. 27-6-1e ..... Arranging D.S. test 2,540 ft.

RANKIN COUNTY

Miss. G. & F. Co.'s No. 1 Hanna, SW cor. SW NE, Sec. 14-5-1e ..... Derrick.
Pioneer O. & G. Co.'s No. 1 Ragland, NE cor. SW SW, Sec. 12-5-1e ..... Cmtd. 10-in. 312 ft; S.D. 1,200 ft.

WILDCAT OPERATIONS IN LOUISIANA-ARKANSAS

(Continued from Page 46)

CLAIBORNE PARISH

Baird Bros. et al's No. 1 Whittaker, 600 ft. N, 400 ft. W, SE cor. NE, Sec. 30-20-7 ..... Fishing D.S. 2,415 ft.

CONCORDIA PARISH

Joe Marr et al's No. 1 Maxwell, C, Sec. 35-3n-8e ..... S.D. 3,622 ft.
Fred Stovall's No. 1 Grasmere (no check), Sec. 23-8-10 .. Drlg. 1,025 ft.
United Gas Public Service Corp.'s No. 3 Saunders, 2,497 ft. E, 3,883 ft. S, NE cor., Sec. 11-8-9, in Sec. 42 .. D.S. test; estimated 2,000,000 to 3,000,000 ft. gas; cmtd. 9-in. 1,400 ft; T.D. 1,438 ft.

DE SOTO PARISH

Dupree-Fountain's No. 1 J. M. Nabors, 250 ft. S, 250 ft. W, NE cor. NW, Sec. 5-13-11 ..... Rig up.
S. A. Guy's No. 1 Dowling Bros., 469 ft. E, 383 ft. S, NW cor. NE, Sec. 31-14-14 ..... S.D; sandy shale 1,354 ft.
Keatchie O. & G. Co.'s No. 1 Hallie Smith (was H. E. Welchert's), NE SE, Sec. 31-14-15 ..... S.D. 2,350 ft.
C. D. Neff et al's No. 1 Ramsey, 1,000 ft. W, 400 ft. S, NE cor. SE, Sec. 33-13-16 ..... Drlg. 2,736 ft.
Ernest Nickelson's No. 1 Nabors, 1,200 ft. N, 1,800 ft. W, SE cor., Sec. 32-13-11 ..... Drlg. 1,405 ft.

NATCHITOCHES PARISH

W. M. Coats' No. 1 Collins, 730 ft. N, 50 ft. E, C, Sec. 28-9-10 ..... Drlg. lime 3,870 ft.
J. W. Cooper et al's No. 1 Cooper, NW SW, Sec. 35-11-10 .. Coring lime 3,025 ft.
Cooper et al's No. 2-A Cooper, C SE SE, Sec. 32-11-10 .. S.D. 1,518 ft.
Gulf Ref. Co.'s No. 1 Bodcaw, 1,910 ft. S, 605 ft. W, NE cor., Sec. 13-12-8 ..... Coring sandy lime 3,892 ft.
C. M. Talley et al's No. 1 C. M. Talley, 1,980 ft. W, 660 ft. S, NE cor. SE, Sec. 29-11-10 ..... Arranging to test 1,256-59 ft.

RED RIVER PARISH

La. Oil & Dev. Co.'s No. 2 La. Delta Pecan Co., 2,950 ft. S, 300 ft. E, NW cor., Sec. 27-13-11 ..... Location.
Lucky Strike Oil Co.'s No. 1 Chaffraix, 200 ft. S, 200 ft. E, C, Sec. 32-12-10 ..... S.D. 3,010 ft.

RICHLAND PARISH

Alto Gas Co.'s No. 2 Hunt, 660 ft. S and E, NW cor., Sec. 13-17-5 ..... Derrick.
Southern Carbon Co.'s No. 1 C. M. Noble, 4,636 ft. N, 2,254 ft. W, cor. Secs. 7, 8, 17 and 18, in Sec. 37-15-6 .. Cmtd. 6-in. 2,285 ft.
Southern Carbon Co.'s No. 1-B C. M. Noble, 2,966 ft. N, 1,525 ft. W, cor. Secs. 7, 8, 17 and 18, in Sec. 37-15-6 .. Location.

SABINE PARISH

Buttram O. & G. Co.'s No. 1 Hale, 200 ft. N, 200 ft. E, SW cor. NE NE, Sec. 1-7-13 ..... Coring 2,162 ft.
Durham Oil Co.'s No. 1 Polly (was Davis et al's), NE cor. NE NE, Sec. 18-8-12 (was Stacy et al's) ..... S.D. 2,102 ft.
Diffie & Barnett's No. 1 Lites (was J. W. Clark's), 330 ft. N, 330 ft. W, SE cor. SW NW, Sec. 34-8-11 .. S.D. 105 ft.
Franks et al's No. 1 Hays, 200 ft. N, 300 ft. E, SW cor. SE, Sec. 22-8-11 ..... Bailing to test 2,380 ft.
Lacey Jessup Oil Co.'s No. 1 Brown Lbr. Co. (was Lacey et al's), C NW NE, Sec. 28-8-10 ..... S.D. 3,160 ft.
Lacey Prod. Co.'s No. 1 Cooper, 330 ft. N, 330 ft. W, SE cor. SW NW, Sec. 30-8-11 ..... W.O.S.R; T.D. 2,620 ft.
Lide et al's No. 1 Ponder, 990 ft. N, 990 ft. W, C, Sec. 15-7-11 ..... W.O.S.R. 2,800 ft.
Lide et al's No. 2 Ponder, 200 ft. S, 200 ft. E, NW cor. NE NW, Sec. 15-7-11 ..... Arranging to deepen 2,520 ft.
Jean Longoria's No. 1 Belton (no check), Sec. 31-9-13 ... Began drlg. Feb. 23; cmtd. 10-in. csg. 103 ft.
Magnolia Pet. Co.'s No. 1 R. J. Lucius, 990 ft. S, 990 ft. W, NE cor. NW NE, Sec. 2-5-12 ..... Drlg. sand 4,136 ft.
Merritt et al's No. 1 Byrd, 200 ft. N, 200 ft. W, SE cor. NW, Sec. 1-7-11 ..... Drlg. 1,862 ft.
Packard O. & G. Co.'s No. 1 Smith (was Caddo-Sabine Synd.'s), Sec. 8-7-10 ..... Drlg. 1,888 ft.
W. P. Pearce et al's No. 1 G. Pearce, 330 ft. N, 330 ft. W, SE cor. SW NW, Sec. 10-7-11 ..... W.O; 150 ft. oil in hole; T.D. 2,600 ft.
Trans-America Oil Corp.'s (was Southland Oil Co.'s), No. 1 Carter, 1,030 ft. W, 345 ft. N, SE cor. SE NE, Sec. 36-8-12 ..... W.O; T.D. 2,513 ft.
John Woodley's No. 1 Sabine Lbr. Co., 400 ft. S, 330 ft. W, NE cor. SE, Sec. 12-8-12 ..... Cmtd. 6⅝-in. csg. 2,310 ft.

TENSAS PARISH

Seip et al's No. 1 Fowler, C SW NE, Sec. 10-10-10 ... S.D. 905 ft.
A. R. Willis et al's No. 1 Currey, 1,320 ft. S, 1,320 ft. E, NW cor., Sec. 39-11-12 ..... S.D. 3,148 ft.

WEBSTER PARISH

Doyle, tr.'s No. 1 Frazer, 200 ft. N, 200 ft. E, SW cor. NE SE, Sec. 27-23-11 ..... Derrick.
Red Hawk Oil Co.'s No. 1 Mathews, 330 ft. N, 330 ft. E, C, Sec. 11-23-9 ..... S.D. 250 ft.

ARKANSAS

CHICOT COUNTY

R. R. Smith's No. 1 Lytle, 660 ft. N, 660 ft. E, C, Sec. 31-18-3 ..... Cmtd. back to 2,888 ft; T.D. 2,925 ft; arranging whipstock 2,865 ft.

CLAY COUNTY

S. C. Jeffus' No. 1 Underwood, 510 ft. N, 350 ft. W, C NW SE, Sec. 4-20-8 ..... Drlg. shale 945 ft.

CLEBURNE COUNTY

(Cable tools)

Donnelly-Craver et al's No. 1 Donophan Lbr. Co., SE cor. NW, Sec. 33-11-9 ..... S.D. 3,740 ft.

CRAWFORD COUNTY

Citizens Gas Co.'s No. 1 G. W. Hood, 600 ft. S, 300 ft. E, NW cor. NE SE, Sec. 13-9-32 ..... Began drlg. Feb. 19; drlg. 750 ft.

DALLAS COUNTY

E. C. Brewer's No. 1 W. E. Hillman, 30 ft. E, 40 ft. S, NW cor. SE NE, Sec. 20-10-13 ..... S.D. curing tiltes 2,644 ft.
J. H. James, tr.'s No. 1 Fordyce Lbr. Co., 200 ft. S, 200 ft. E, NW cor. NW NE, Sec. 11-9-15 ..... Arranging D.S. test 2,055 ft.

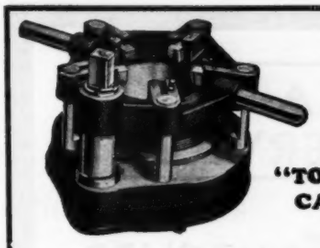
GARLAND COUNTY

(Cable tools)

Givens et al's No. 1 Garrett, 660 ft. S, 660 ft. W, C Sec. 1-3-19 ..... Fishing 5 3/16-in.; T.D. 3,756 ft.

GRANT COUNTY

Spann & McClung's No. 1 Sarah Page, 660 ft. W, 660 ft. S, NE cor. NW, Sec. 3-3-12 ..... S.D. for csg. 438 ft.



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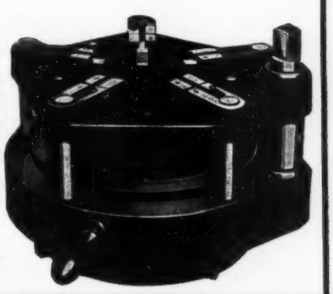

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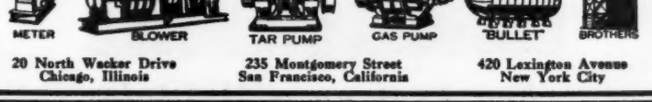

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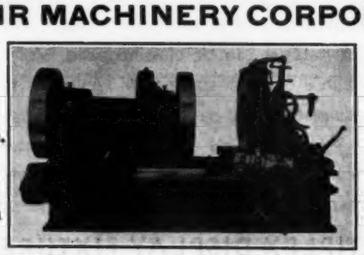

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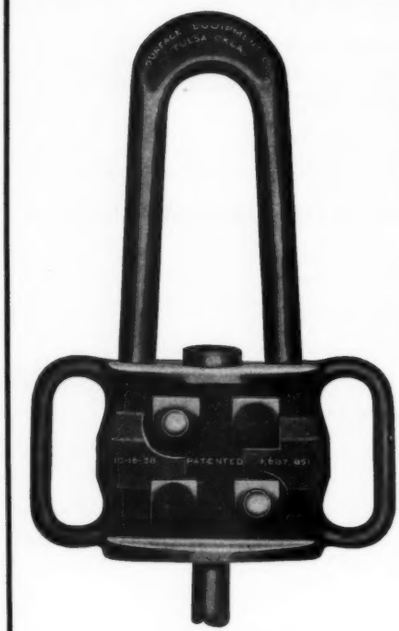

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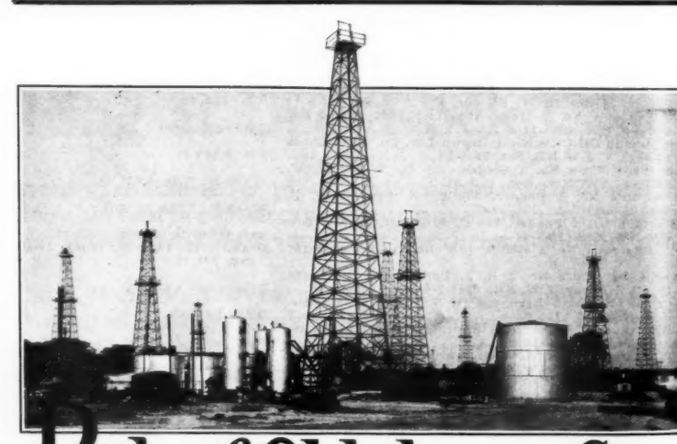

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Washington, Penna.
Western Representative:
RIG EQUIPMENT COMPANY, 1224 N. W. 33rd St., Oklahoma City, Okla.

HOT SPRINGS COUNTY

John Watkins' No. 1 Cunningham (was J. R. Lockhart's), 285 ft. S, 285 ft. W, NE cor., Sec. 11-5-16 .. S.D. 100 ft.

LAFAYETTE COUNTY

McIver et al's No. 1 Hottle, NW cor. NE, Sec. 1-20-6.... S.D. for fuel 2,345 ft.
Smitherman & McDonald's No. 1 Reed, 200 ft. N, 200 ft. W, SE cor. NW NW, Sec. 16-15-22..... Cmtd. 8-in. 1,180 ft; T.D. 1,194 ft.

LITTLE RIVER COUNTY

Roberts Oil Co.'s No. 1 H. J. Russell, 330 ft. E, 330 ft. S, NW cor., Sec. 25-12-29..... Location.

LOGAN COUNTY

J. H. Flowers' No. 1 J. H. White, Sec. 13-6-26..... S.D; W.O. 3,610 ft.

MADISON COUNTY
(Cable tools)

J. W. Baxter's No. 2 Hallin, C, Sec. 17-16-25..... T.A. 405 ft.
J. W. Baxter's No. 3 Hallin, NE SW, Sec. 1-17-26..... S.D. 50 ft.

MILLER COUNTY

Bullock Oil Co.'s No. 1 Hervey, SE NE Sec. 33-14-26.... D.S. stuck 2,720 ft; T.D. 2,813 ft.
East Texas O. & G. Co.'s No. 1 Harvey, 500 ft. E, 300 ft. S, NW cor., Sec. 2-15-26..... S.D. 2,961 ft.
E. & F. Oil Co.'s No. 1 E. L. Beck, 200 ft. S, 200 ft. E, NW cor. SW, Sec. 36-15-26..... S.D. litigation; T.D. 2,968 ft.
Fitzwater et al's No. 1 Beck, 200 ft. N, 200 ft. W, SE cor. SW SE, Sec. 33-15-26..... Set 10-in. csg. 93 ft; S.D. 150 ft.
Gusher Bend Oil Co.'s No. 1 Adams, 120 ft. S, 800 ft. W, NE cor. NW, Sec. 26-14-26..... Drlg. 2,593 ft.
Lenz et al's No. 2 Johnson, SE cor., Sec. 24-15-16 ..... S.D. 4,550 ft.
Lenz et al's No. 3 Johnson, 250 ft. W, 150 ft. N, SE cor. NE NW, Sec. 24-15-26..... S.D. 2,850 ft.
J. D. McRae's No. 1 Smith, 150 ft. N, 150 ft. W, SE cor., Sec. 28-15-26..... Derrick.
Salzer & McRae's No. 1 Rose, SW cor. NE SW, Sec. 9-16-26 ..... S.D. fuel 475 ft.

OUACHITA COUNTY

Belmont et al's No. 1 Buck, SE cor. SE SW, Sec. 16-15-17 ..... S.D. 2,907 ft.
Copenhaven et al's No. 1 Elliott, Sec. 11-15-17..... S.D; W.O. 2,137 ft.

PIKE COUNTY

E. R. Henderson's No. 1 Tilyou, 660 ft. W, 500 ft. S, NE cor. NE SE, Sec. 26-8-14..... Reaming to bottom 2,335 ft.
E. R. Henderson's No. 1 J. L. Lee, 400 ft. S, 350 ft. E, NW cor. SW SE, Sec. 31-8-24..... Derrick.

POPE COUNTY

Ark.-La. P. L. Co.'s No. 1 Baird, 760 ft. S, 660 ft. E, NW cor., Sec. 11-7-20..... Drlg. sandy shale 735 ft.
Ark.-La. P. L. Co.'s No. 2 McFaddin, 685 ft. N, 485 ft. W, SE cor. NE SW, Sec. 15-9-21..... Drlg. hard sand 3,995 ft.

SCOTT COUNTY

Ark. Valley Gas Co.'s No. 1 Turner, C SE, Sec. 27-5-30.. Location.
Heavener O. & G. Co.'s No. 1 Riser, Sec. 36-4-26..... S.D. 1,536 ft.
Waldron O. & G. Co.'s No. 1 White, NE cor. SW NW, Sec. 17-3n-29..... Began on second hole Feb. 25; cmtd. 10-in. csg. 223 ft; drlg. 300 ft.

UNION COUNTY

Chapman & Wilson's No. 1 A. H. Hadley, 330 ft. N, 330 ft. E, SW cor. NE SW, Sec. 3-18-13..... Cmtd. 6⅝-in. 3,559 ft.
S. B. Hickman's No. 1 Hogg, 330 ft. S, 150 ft. E, NW cor. SE SE, Sec. 35-16-17..... S.D. W.O. 3,247 ft.
Marine Oil Co.'s No. 2-B Thompson, 330 ft. N, 330 ft. E, SW cor. SE NE, Sec. 10-18-13..... Cmtd. 6⅝-in. O.D. csg. 3,577 ft; T.D. 3,582 ft.
C. H. Murphy et al's No. 1 Union Saw Mill Co., 330 ft. E. 330 ft. N, SW cor. NW SW, Sec. 18-18-13..... Set 10-in. 111 ft; arranging D.S. test 2,198-2,202 ft.

VAN BUREN COUNTY

Glenn Kohle et al's No. 1 Scalan, 200 ft. S, 200 ft. W, NE cor. SE NW, Sec. 5-19-13..... S.D. 50 ft.

WASHINGTON COUNTY
(Cable tools)

Delbert & Graves' No. 1 Cunningham, Sec. 14-15-32..... S.D; W.O. 602 ft.
C. H. Willoughby's No. 1 Jones, Sec. 34-16-30..... Drlg. 1,745 ft.
H. H. Taylor et al's No. 1 Runny, C NE SW, Sec. 1-13-29. S.D. 1,700 ft.

YELL COUNTY
(Cable tools)

Tegmeier & Luckett's No. 1 Falcon, Sec. 36-7-21..... S.D. 5,710 ft.

EAST TEXAS

BOWIE COUNTY

Maud-Redwater Oil Co.'s No. 1 Merritt, 175 ft. N, 175 ft. E, SE cor. G. W. Hardidge 100-ac. tr. on Floyd Merritt tr. in Y. S. McKinney Sur. ..... S.D. 632 ft.
Lee Timberlake et al's No. 2 Tidwell, 2,610 ft. N, 655 ft. W, SE cor. T. M. Rice Sur. ..... S.D. 720 ft.

CAMP COUNTY

McDonald Bros.' No. 1 Tillery, 150 ft. E, 450 ft. S, NW cor. 127-ac. tr. in J. H. Murphy Sur. ..... S.D. 3,600 ft.

CASS COUNTY

Olds & Smith's No. 1 Atheny, 3,056 ft. W-E line, 856 ft. S-N line, J. C. Byers Sur. ..... S.D. 1,470 ft.
John C. Rogers' No. 1 I. E. Lanier, 573 ft. N, 879 ft. W, SE cor. Lanier 86 ac. in K. E. Welborn Sur. .... Cmtd. 6⅝-in. 2,275 ft.
John C. Rogers et al's No. 1 W. Q. Henderson, 3,100 ft. S, 3,100 ft. E, NW cor. Wm. Davis. Sur. ..... S.D. 810 ft.
J. E. Smitherman's No. 1 Bell, 385 varas S, 108 varas W, NE cor. J. E. Ferrall Sur. ..... Drlg. 2,655 ft.

HARRISON COUNTY

Corona Pet. Co.'s No. 1 A. J. Bohler, C, Bohler 140 ac. in SW cor. S. F. Sparks Sur. ..... S.D. curing titles 1,460 ft.
Crump & Hannegan's No. 1 Dunn, Betty Humphreys Sur.. Drlg. 2,960 ft.
W. M. Hobson, tr.'s No. 1 P. P. Taylor, Hy Vardaman Sur. ..... Began drlg. Feb. 25; cmtd. 12-in. 355 ft; drlg. 1,600 ft.
S. D. Hunter's No. 2 Doherty, W. D. Burris Sur. ..... Drlg. 3,528 ft.
O. H. Parkening's No. 1 T. J. Taylor, center Blk. 32, W. H. Payne Sur. ..... Derrick.
O. H. Parkening's No. 2 T. J. Taylor, center J. C. Hawley Sur. ..... Derrick.
W. G. Ray Drlg. Co.'s No. 1 F. C. Hall, D. Davis Sur. ... S.D. curing titles 2,000 ft.
Rowe-Nichlos' No. 1 Pitts, E. A. Merchant Sur. ..... Location.
Seigal Bros. and Kelinson's No. 1 Taylor (no check), F. O'Niel Sur. ..... Location.

MARION COUNTY

Geo. Hindman et al's No. 1 F. V. Lindsey, 2,500 ft. S, most northerly N line, 3,555 ft. E most easterly W line, Alexander Albright Sur. ..... S.D. repairs 400 ft.
Hindeman & Rhondo's No. 1 McGaughey, 1,547 ft. W, most northerly SW cor., 1,638 ft. N, most northerly S line, W. J. Willis Sur. ..... S.D. 2,300 ft.
P. E. Hussey's No. 1 A. A. Trammell, Chas. Lockhart Sur. ..... S.D. 1,884 ft.
Shasta Oil Co.'s No. 1 B. E. Johnson, approximately 1,500 varas E and 500 varas S of SE cor. E. S. T. Greer Sur. in Wm. Mason Sur. ..... Bldg. derrick.

PANOLA COUNTY

Everette Drlg. Co.'s No. 1 E. L. McDaniels, 200 ft. S, 200 ft. W, NE cor. McDaniels' 116 ac., Alanson Barr Sur. ..... Began drlg. Feb. 22; blew out at 400 ft; estimated 1,000,000 ft. gas; on fire.

RED RIVER PARISH

D. M. Buffington's No. 1 Hossler, E. Hughhart Sur. .... S.D. 2,795 ft.
Johnson Pet. Co.'s No. 2 Randolph, Edw. Dean Sur. .... S.D. 2,280 ft.

SHELBY COUNTY

I. M. Bradley's No. 1 Ashberry (no check), G. W. Mitchell Sur. ..... Location.
Chapparell Oil Co.'s No. 2 Holt, Matthew Moore Sur. .... S.D. 3,111 ft.
Sloan Prospecting Co.'s No. 1 Sanford, approximately 300 ft. N and 200 ft. E, SW cor. B. Sanford 49-ac. tr. in M. M. Vann Sur. ..... Derrick.

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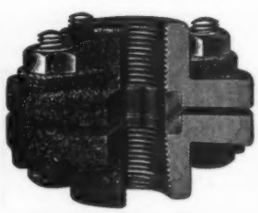

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UNION OIL ELECTION AND UNION ASSOCIATES

LOS ANGELES, Calif., Mar. 7.—At the annual meeting of the stockholders of the Union Oil Co. of California, the following were elected members of the board of directors: E. W. Clark, chairman of board; L. P. St. Clair, president; R. D. Matthews, executive vice president: W. W. Orcutt, vice president; P. N. Boggs, vice president; W. L. Stewart, Jr., vice president; C. W. Brown, A. B. Macbeth,

Paul M. Gregg

A. P. Johnson, Gurney E. Newlin, Henry M. Robinson, Isaac B. Newton, E. J. Bermingham, Stanley W. Morsehead, Dwight Whiting, J. E. Jardine and W. S. Charnley.

Paul M. Gregg, general council of the company since March 1, 1921, was elected a vice president. Admitted to the bar in 1896 in San Luis Obispo following his graduation from Stanford, Mr. Gregg has devoted his attention to the legal aspects of the oil business since 1902. With the opening of the Santa Maria and Midway-Sunset Fields his services were called for by a number of the new companies operating in these two areas. He first represented the Union Oil Co. in a legal capacity in 1904. He, however, did not devote his time exclusively to the company until retained as general counsel in 1921.

E. W. Clark, chairman of the board of the Union Oil Co., was elected president of Union Oil Associates at the annual meeting, filling the vacancy created by the resignation of Henry M. Robinson, president since 1923. Mr. Robinson, who is now in Washington, D. C., advised the directors he would no longer be able to give the necessary time to the office. He retains his directorship.

Dwight Whiting was elected first vice president; Stanley W. Morsehead, second, and I. B. Newton, third. Lee B. Milbank was re-elected secretary-treasurer.

R. D. Matthews, executive vice president of the Union Oil Co., the only new director elected to the board, fills the vacancy created by the death of the late W. L. Stewart.

The other members of the board are: Dr. M. N. Avery, E. W. Clark, Shannon Crandall, George I. Cochran, Fillmore Condit, Paul M. Gregg, John Earle Jardine, A. P. Johnson, Ernest H. Lockwood, J. S. MacDonnell, Lee B. Milbank, Stanley W. Morsehead, I. B. Newton, W. W. Orcutt, Henry M. Robinson, W. L. Stewart, Jr., L. P. St. Clair, J. G. Warren and Dwight Whiting.

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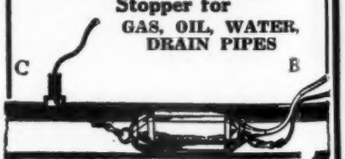

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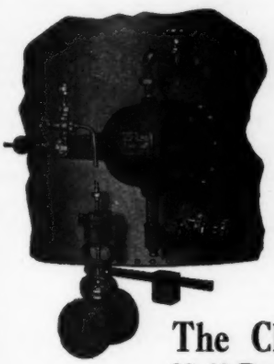

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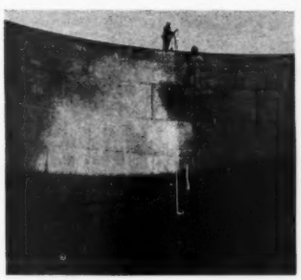

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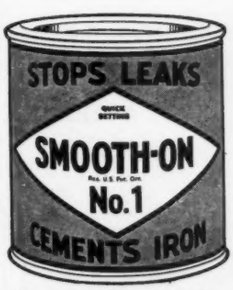

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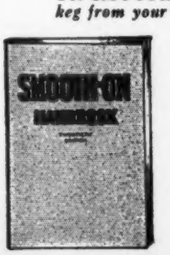

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Oklahoma-Kansas and Eastern Pipe Line Report

OKLAHOMA-KANSAS
Pipe Line Report for Month of December

Runs

	Month (bbls.)	Dly. av. (bbls.)
Prairie P. L. Co.	1,271,000	41,000
Gulf P. L. Co.	1,323,002	39,419
Texas P. L. Co.	679,732	21,929
Magnolia P. L. Co.	1,626,201	52,456
Empire P. L. Co.	1,900,653	61,311
Cosden P. L. Co.	741,249	23,911
Sinclair P. L. Co.	3,007,000	97,000
Oklahoma P. L. Co.	2,250,752	72,605
Other lines	5,549,000	179,000
Total December	18,247,639	588,633
Total November	18,336,190	611,206
Difference	88,551	22,573

Shipments

Prairie P. L. Co.	1,994,387	64,335
Gulf P. L. Co.	276,301	8,913
Texas P. L. Co.	1,037,037	33,453
Magnolia P. L. Co.	1,692,340	54,592
Empire P. L. Co.	1,768,811	57,058
Cosden P. L. Co.	508,332	16,398
Stanolind P. L. Co.	2,957,681	95,409
Oklahoma P. L. Co.	2,364,071	76,261
Other lines	5,301,000	171,000
Total December	17,899,960	577,419
Total November	22,032,627	710,729
Difference	413,667	133,310

Stocks

Prairie O. & G. Co.*	28,358,000
Gulf P. L.-Gypsy Oil Co.	3,401,860
The Texas Company	3,489,849
Magnolia Petroleum Co.	5,700,152
Empire P. L. Co.	5,300,761
Mid-Continent Pet. Corp.	4,256,397
Sinclair Crude Oil Pur. Co.*	18,500,000
Oklahoma P. L. Co.	2,758,021
Carter Oil Co.	10,069,192
Other lines*	22,355,000
Total December	119,753,742
Total November	120,275,702
Difference	521,960

*Estimated. Prairie and Stanolind shipments include Texas oil.

EASTERN PIPE LINE REPORT FOR JANUARY

Runs From Wells

In the following table will be found the regular receipts from wells by various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky, Illinois, Indiana and Michigan for December and January:

	Dec., 1930	Jan., 1931
Nat. Transit	110,146.31	127,013.27
S. W. Pa. P. L.	72,041.68	75,179.62
Eureka P. L.	289,000.11	292,615.52
Buckeye P. L. (Mackb'g)	325,496.03	311,885.14
Buckeye P. L. (Cleve.)	11,757.62	11,175.80
Buckeye P. L. (Lima, etc.)	82,364.67	91,601.51
Indiana P. L.	3,342.37	3,805.02
Cumberland P. L.	178,692.00	174,361.92
N. Y. Transit	28,548.26	27,836.13
Tide Water P. L.	27,349.30	25,747.93
Pure Oil	204,537.02	220,231.74
Stoll Oil Ref.	14,378.02	.....
Bradford Tran.	319,175.02	310,660.96
East Gulf Oil	7,156.40	.....
Total	1,673,984.81	1,672,114.62
Daily average	53,999.19	53,939.18

Note—Indian Refining Co. had other receipts of 293,705.56 bbls.

Petroleum Deliveries

The following tables exhibit the shipments or regular deliveries of various pipe lines in New York, Pennsylvania, West Virginia, Ohio, Kentucky and Indiana for December and January:

	Dec., 1930	Jan., 1931
Nat. Transit	418,614.12	431,427.59
S. W. Pa. P. L.	243,352.43	311,121.19
Eureka P. L.	268,939.44	333,443.59
Buckeye P. L. (Macksb'g)	247,581.49	257,687.49
Buckeye P. L. (Cleve.)	1,464.51	1,462.63
Buckeye P. L. (Lima, etc.)	1,063,204.74	1,121,462.88
Indiana P. L.	287,189.39	644,291.15
Cumberland P. L.	129,255.52	109,598.07
Southern P. L.	27,773.80	65,326.45
N. Y. Transit	189,599.54	174,756.43
Northern P. L.	78,349.64	230,180.55
Tide Water P. L.	359,965.20	536,454.77
Pure Oil	69,124.29	86,532.61
Indian Ref.	280,245.79	278,699.79
Bradford Tran.	373,859.08	364,290.68
Tuscarora Oil	369,139.82	489,729.45
East. Gulf Oil	5,397.60	.....
Total	4,413,056.40	5,436,465.31
Daily average	143,001.82	175,369.85

Gross Stocks

The gross stocks held by various pipe lines in the oil-producing sections of New York, Pennsylvania, West Virginia, Ohio, Indiana and Kentucky and Indiana at the close of December and January:

	Dec., 1930	Jan., 1931
Nat. Transit	796,609.10	839,235.79
S. W. Pa. P. L.	444,175.42	432,473.26
Eureka P. L.	1,500,225.43	1,548,201.04
Buckeye P. L. (Macksb'g)	643,952.78	597,544.40
Buckeye P. L. (Cleveland)	37,246.45	54,263.96
Buckeye P. L. (Lima, etc.)	4,424,779.87	4,554,991.51
Indiana P. L.	587,459.89	562,567.51
Cumberland P. L.	592,631.01	623,458.27
Southern P. L.	292,250.09	265,515.03
N. Y. Transit	140,232.95	161,624.59
Northern P. L.	515,798.08	368,986.82
Tide Water P. L.	1,049,178.91	979,269.83
Pure Oil	467,768.78	605,621.04
Indian Ref.	55,677.44	70,080.52
Tuscarora	15,325.72	14,447.96
Brad. Trans.	183,944.67	152,811.37
East. Gulf	4,695.82	.....
Total	11,751,952.41	11,831,092.90
Difference	99,428.51	79,140.49

Grades of Oil

The following table shows the amount of the different grades of oil held by the Eastern Pipe Lines at the close of December and January, showing gross stocks of the above fields:

	Dec., 1930	Jan., 1931
Pennsylvania	3,950,817.59	3,904,310.87
Lima	757,684.69	800,240.43
Kentucky	643,036.25	665,271.73
Mid-Continent	5,903,435.98	5,863,671.90
Illinois	40,169.01	3,659.28
Michigan	456,808.89	593,938.69
Total	11,751,952.41	11,831,092.90

Daily Average Runs

The following table shows the daily average runs of the Pennsylvania, Lima and Kentucky oil fields for the past four years:

	1928	1929	1930	1931
Jan.	52,904	51,749	75,907	53,939
Feb.	57,002	51,833	79,256	.....
Mar.	57,485	54,252	76,688	.....
April	56,812	58,444	84,536	.....
May	62,067	59,902	80,548	.....
June	58,230	58,833	75,430	.....
July	57,144	66,087	68,921	.....
Aug.	57,745	66,087	54,291	.....
Sept.	53,487	67,315	56,595	.....
Oct.	58,100	76,093	58,179	.....
Nov.	53,865	74,831	52,332	.....
Dec.	52,025	74,561	53,999	.....

Daily Average Shipments

The following table gives daily average shipments from the Pennsylvania, Lima and other fields for the past four years:

	1928	1929	1930	1931
Jan.	146,465	165,721	217,623	175,369
Feb.	167,368	159,387	224,355	.....
Mar.	158,883	161,474	228,846	.....
April	172,935	169,737	241,845	.....
May	180,559	184,281	248,383	.....
June	188,024	185,404	234,401	.....
July	189,470	194,763	207,094	.....
Aug.	192,853	194,946	205,506	.....
Sept.	194,138	201,214	193,999	.....
Oct.	176,000	191,367	157,675	.....
Nov.	176,898	202,743	146,638	.....
Dec.	173,572	186,257	143,001	.....

Gross Stocks

In the following table will be found the gross stocks of the various lines of the Pennsylvania, Lima and Kentucky oil fields, including oil received from other lines at the close of each month for the past three years:

	1929	1930	1931
Jan.	7,596,564	12,220,045	11,831,092
Feb.	8,738,835	12,991,561	.....
Mar.	9,002,058	13,247,217	.....
April	8,978,172	13,233,961	.....
May	8,903,560	13,052,953	.....
June	8,921,275	13,396,855	.....
July	9,211,595	13,268,562	.....
Aug.	9,440,643	13,047,051	.....
Sept.	9,443,067	12,812,018	.....
Oct.	9,441,101	12,437,555	.....
Nov.	9,368,538	11,851,380	.....
Dec.	11,253,953	11,751,952	.....

The Illinois Field

The following table gives the report of the Illinois Pipe Line Co. in Illinois:

Gross stocks, February 1	1,942,817.12
Runs from wells	442,681.05
Other receipts	157,854.19
Regular deliveries	606,697.37
Other deliveries	200,580.64

The amount of Illinois oil run by the Tide Water Pipe Line Co. in January was 25,747.99 bbls. Deliveries were 62,875.82 bbls. Adding these figures to those of the Illinois Pipe Line Co. makes the runs and deliveries as follows:

1931—	Runs	Deliveries
Jan.	468,429.04	669,573.19
1929—		
Feb.	517,320.17	503,387.70
Mar.	728,319.67	586,049.60
April	515,374.27	654,297.96
May	608,981.60	673,812.83
June	568,454.70	818,845.97
July	611,106.79	828,159.44
Aug.	625,351.99	746,425.06
Sept.	582,457.66	669,947.72
Oct.	622,302.83	558,558.68
Nov.	565,108.75	427,064.63
1930—		
Jan.	543,387.95	498,293.93
Feb.	548,416.33	414,536.59
Mar.	631,944.49	469,119.53
April	530,074.22	509,304.60
May	605,147.37	504,069.84
June	572,662.57	468,658.31
July	604,529.54	388,454.47
Aug.	594,642.12	375,742.42
Sept.	457,001.11	371,691.63
Oct.	478,442.12	320,688.73
Nov.	422,794.68	355,403.12
Dec.	556,418.78	363,719.55

Tide Water Pipe Co., Ltd., also delivered in January 270,086.49 bbls. Oklahoma oil.

AVERAGE DAILY RECEIPTS OF CALIFORNIA CRUDE AND REFINED OIL AT ATLANTIC AND GULF PORTS

Average barrels per day in 1930-31—	ATLANTIC PORTS: Baltimore	Boston	New York	Philadelphia	Others	Total	GULF COAST PORTS: Galveston	New Orleans, Baton Rouge	Port Arthur, Sabine Pass	Tampa	Total	Total all ports
February	7,678	.....	24,714	14,321	5,000	51,714	.....	.....	.....	.....	2,607	54,321
March	10,548	3,066	28,871	8,774	22,484	73,742	.....	.....	.....	.....	805	74,548
April	7,767	.....	14,369	11,600	7,433	41,167	.....	.....	.....	.....	7,600	48,767
May	5,194	8,451	28,161	9,484	2,774	54,064	.....	.....	.....	.....	774	54,838
June	8,300	.....	33,933	20,767	2,333	65,333	.....	.....	.....	.....	2,400	67,733
July	17,355	7,774	43,419	23,839	6,452	98,839	.....	.....	.....	.....	4,645	103,484
August	7,418	8,742	38,968	21,226	5,258	81,613	.....	.....	.....	.....	97	81,710
September	6,300	6,400	25,600	13,400	9,567	61,267	.....	.....	.....	.....	2,433	63,700
October	2,516	3,065	27,258	16,419	4,903	54,161	.....	.....	.....	.....	5,355	59,516
November	8,367	6,233	33,800	17,733	4,600	70,733	.....	.....	.....	.....	4,800	75,533
December	5,516	4,323	30,645	9,678	3,580	53,742	.....	.....	.....	.....	4,645	58,387
January	8,387	6,613	21,968	14,678	11,096	62,742	.....	.....	.....	.....	6,129	68,871

AVERAGE DAILY IMPORTS OF CRUDE AND REFINED OIL AT PRINCIPAL UNITED STATES PORTS

Average barrels per day in 1930-31—	ATLANTIC PORTS: Baltimore	Boston	New York	Philadelphia	Others	Total	GULF COAST PORTS: Galveston	New Orleans, Baton Rouge	Port Arthur, Sabine Pass	Tampa	Total	Total all ports
February	24,500	14,714	147,357	36,036	39,786	262,933	2,821	11,072	3,500	1,964	19,357	281,750
March	28,355	4,839	151,806	36,645	34,903	255,548	4,323	11,645	839	2,419	19,226	274,774
April	31,400	8,933	123,500	40,433	19,434	223,700	.....	7,400	2,433	4,167	14,000	237,700
May	24,129	9,322	174,194	39,291	28,226	275,161	3,194	11,548	2,935	1,323	24,000	299,161
June	51,533	15,667	121,067	45,033	25,033	258,333	4,413	17,367	2,167	1,333	25,300	283,663
July	42,097	9,548	154,968	37,935	36,032	280,580	5,678	9,161	2,097	2,387	19,323	299,903
August	39,032	4,484	145,613	33,355	25,097	247,581	8,419	9,323	8,548	3,000	29,290	276,871
September	38,867	8,533	150,933	34,500	25,567	258,400	6,433	12,234	.....	3,800	22,467	280,867
October	19,839	11,742	146,194	35,355	26,967	240,097	6,065	7,067	2,774	2,545	18,451	258,548
November	39,633	35,900	124,633	36,467	24,667	261,300	2,467	7,366	.....	1,767	11,600	272,900
December	21,419	14,033	122,774	32,839	33,774	224,839	6,290	10,613	2,097	290	19,290	244,129
January	17,613	13,519	154,225	32,902	30,612	248,871	2,032	11,677	2,097	3,097	18,903	267,774

GROSS PRODUCTION OF CRUDE OIL IN THE UNITED STATES FOR 12 MONTHS (Revised)

(In Barrels of 42 Gallons)

1930—		California	Oklahoma	Texas	Kansas	Arkansas	Louisiana	Rocky Mts.	Eastern	Total
January:	Month	21,983,242	20,802,984	25,284,352	3,273,197	1,817,685	1,780,751	2,151,090	4,113,000	81,206,301
	Daily average	709,137	671,064	815,624	105,587	58,635	57,444	69,390	132,678	2,619,558
February:	Month	20,885,660	17,977,624	23,314,637	2,965,704	1,608,376	1,738,250	2,027,984	3,963,000	74,481,235
	Daily average	745,916	642,058	832,669	105,918	57,442	62,080	72,428	141,536	2,660,044
March:	Month	19,699,979	19,115,406	25,503,082	3,504,395	1,817,871	1,942,938	2,337,028	4,223,000	78,143,699
	Daily average	635,483	616,626	822,679	113,045	58,641	62,675	75,388	136,161	2,520,764
April:	Month	18,768,743	19,541,310	24,799,763	3,734,253	1,724,460	1,909,552	2,334,810	4,257,000	77,069,891
	Daily average	625,625	651,377	826,659	124,475	57,482	63,652	77,827	141,900	2,568,996
May:	Month	19,044,444	20,587,503	26,219,488	3,978,385	1,659,895	1,907,482	2,565,219	4,414,000	80,376,776
	Daily average	614,337	664,113	845,786	128,335	53,545	61,543	82,749	142,387	2,592,799
June:	Month	18,020,795	19,754,700	25,643,705	3,765,060	1,704,060	1,925,621	2,519,190	4,288,000	77,621,131
	Daily average	600,693	658,490	854,790	125,502	56,802	64,187	83,973	142,933	2,587,371
July:	Month	18,802,024	18,032,514	25,973,521	3,541,409	1,713,680	2,079,769	3,275,894	3,830,000	77,248,811
	Daily average	606,517	581,694	857,856	114,239	55,280	67,089	105,674	123,548	2,491,897
August:	Month	18,770,466	17,162,034	25,069,598	3,491,530	1,700,102	2,151,120	3,193,341	3,417,000	74,955,191
	Daily average	605,499	553,614	808,696	112,630	54,842	69,391	103,011	110,226	2,417,909
September:	Month	17,984,306	16,509,120	23,111,822	3,405,510	1,583,280	2,008,060	3,239,010	3,396,000	71,237,108
	Daily average	599,477	550,304	770,394	113,517	52,776	66,935	107,967	113,200	2,374,570
October:	Month	18,244,053	16,632,523	23,626,553	3,571,913	1,636,552	2,142,885	3,225,550	3,627,000	72,707,029
	Daily average	588,518	536,533	762,147	115,223	52,792	69,125	104,050	117,000	2,345,388
November:	Month	18,109,459	14,941,770	22,035,222	3,459,330	1,557,870	2,136,948	2,957,100	3,222,000	68,419,699
	Daily average	603,648	498,059	734,507	115,311	51,929	71,231	98,570	107,400	2,280,656
December:	Month	17,786,728	15,057,103	21,810,359	3,432,661	1,590,951	2,157,534	3,118,663	3,328,000	68,281,999
	Daily average	573,765	485,713	703,560	110,731	51,321	69,598	100,602	107,355	2,202,645
Total 12 months		228,099,899	216,114,591	292,392,102	42,123,347	20,114,782	23,881,270	32,944,879	46,078,000	901,748,870
Daily average		624,931	592,095	801,074	115,406	55,109	65,428	90,260	126,241	2,470,545